DEFENSE INDUSTRY BULLETIN

D1.3/2:3/3

Volume 3, No. 3

March 1967

UNIVERSITY OF FLORIDA LIBRARIES
APR 1967

IN THIS ISSUE

Fiscal Year 1967 Supplemental for Southeast Asia ---- 1
Desert Bonanza ---- 9
Project ARISTOTLE ---- 22
Management Systems Control ---- 26
U.S.-U.K. Logistics Cooperation ---- 28
DNL/DLP—A Focal Point for Laboratory Management ---- 30

DEPARTMENTS

About People ---- 13
From the Speakers Rostrum ---- 14
Speakers Calendar ---- 20
Calendar of Events ---- 21
Bibliography ---- 24
Meetings and Symposia ---- 33
Defense Procurement ---- 34

DEPARTMENT OF DEFENSE

UNIV. OF FLORIDA LIBS.
DOCUMENTS DEPARTMENT
U.S. DEPOSITORY

Publication of

ASSISTANT SECRETARY OF DEFENSE-PUBLIC AFFAIRS

Loaded for Action

A U.S. Marine private, armed with an M-14 rifle and 3.5-inch rocket launcher, wades through a flooded rice field during search and destroy operations south of Da Nang, Vietnam.

(See statement on Fiscal Year 1967 Supplemental for Southeast Asia on page 1.)

Phil G. Goulding Sworn in as New Assistant Secretary of Defense (Public Affairs)

Secretary of Defense Robert S. McNamara administers the oath of office to the new Assistant Secretary of Defense for Public Affairs, Phil G. Goulding, during ceremonies at the Pentagon Feb. 28. Mr. Goulding has been serving as Deputy Assistant Secretary of Defense for Public Affairs for nearly two years. He was a member of the Washington bureau of the *Cleveland Plain Dealer* before entering Government service.

Study Group Formed To Examine Future Construction of Navy Escort Ships

The Navy has begun a study of ship design and construction to determine the optimum characteristics of the escort ships it will need in the 1970's and the means of producing them. At this point the ships are not yet in the design state but are known as the DX and DXG from the designations presently used for the destroyer, destroyer escort and frigate types.

A study group formed within the Office of the Chief of Naval Operations will examine missions and roles for the ships and will make specific recommendations concerning the capabilities which should be built into the new vessels and the number that should be built. Special emphasis will be placed on answering these problems before contract definition. Subject to the results of these studies, it is expected that private industry will be invited to make proposals for detailed design and construction of the ships.

The study will seek also to establish common standards among these ships in order to realize economies in production and to realize the benefits of modular construction in series production—building similar components in series rather than on an intermittent, variable design basis.

Rear Admiral Thomas R. Weschler, USN, has been assigned to the Office of Chief of Naval Operations as the DX/DXG Program Coordinator.

It is expected that, when a determination is made to enter a competitive contract definition phase for the DX/DXG, a classified briefing for industry will be held in Washington, D.C., early in the fiscal year beginning July 1, 1967.

DEFENSE INDUSTRY BULLETIN

Published by the Department of Defense

Hon. Robert S. McNamara
Secretary of Defense

Hon. Cyrus R. Vance
Deputy Secretary of Defense

Hon. Phil G. Goulding
Assistant Secretary of Defense (Public Affairs)

Col. Joel B. Stephens, USA
Director for Community Relations

Col. Edwin C. Gibson, USA
Chief, Business & Labor Division

Editor........LCdr. E. W. Bradford, USN
Assoc. Editor..........Miss Cecilia Pollok
Assoc. Editor............Mr. Rick La Falce
Editorial Assistant
Norman E. Worra, JO1, USN

The *Defense Industry Bulletin* is published monthly by the Business & Labor Division, Directorate for Community Relations, Office of the Assistant Secretary of Defense (Public Affairs). Use of funds for printing this publication was approved by the Director of the Bureau of the Budget.

The purpose of the *Bulletin* is to serve as a means of communication between the Department of Defense (DOD) and its authorized agencies and defense contractors and other business interests. It will serve as a guide to industry concerning official policies, programs and projects, and will seek to stimulate thought by members of the defense-industry team in solving the problems that may arise in fulfilling the requirements of the DOD.

Material in the *Bulletin* is selected to supply pertinent unclassified data of interest to the business community. Suggestions from industry representatives for topics to be covered in future issues should be forwarded to the Business & Labor Division.

The *Bulletin* is distributed without charge each month to representatives of industry and to agencies of the Department of Defense, Army, Navy and Air Force. Requests for copies should be addressed to the Business & Labor Division, OASD(PA), Room 2E813, The Pentagon, Washington, D.C. 20301, telephone, (202) OXford 5-2709.

Contents of the magazine may be reprinted freely without requesting permission. Mention of the source will be appreciated.

Fiscal Year 1967 Supplemental for Southeast Asia

[*Editor's note: The following is the statement of Secretary of Defense Robert S. McNamara before a joint session of the Senate Armed Services Committee and the Senate Subcommittee on Department of Defense Appropriations on the FY 1967 Supplemental for Southeast Asia on Jan. 23, 1967. Space limitations do not permit carrying the entire statement. We have, however, attempted to excerpt those portions which are of special interest to industry.*]

Last year when I appeared before this Committee in support of the FY 1967–71 program and the FY 1967 Budget I said:

> "With regard to the preparation of the FY 1967–71 program and the FY 1966 Supplemental and the FY 1967 Budget, we have had to make a somewhat arbitrary assumption regarding the duration of the conflict in Southeast Asia. Since we have no way of knowing how long it will actually last, or how it will evolve, we have budgeted for combat operations through the end of June 1967. This means that if it appears that the conflict will continue beyond that date, or if it should expand beyond the level assumed in our present plans, we will come back to the Congress with an additional FY 1967 request."

Throughout the spring and summer of last year in my appearances before the various Congressional Committees, I reiterated the fact that the FY 1967 Budget was based on the arbitrary assumption that the conflict would end by June 1967, and that additional funds would be required if the conflict continued. I also repeatedly stated, both before the Congressional Committees and in public statements, that defense spending would rise above the Budget level if we had to take actions to provide for the continuation of the conflict beyond June 30, 1967. . . .

Inasmuch as I will soon appear before this Committee again in support of the FY 1968–72 Program and the FY 1968 Budget, I would like to confine my statement at this time to the military situation in Southeast Asia and the additional financial requirements for the balance of the current fiscal year arising from that conflict.

Policy Objectives and Military Tasks in Vietnam.

In formulating our military objectives and operational plans for Vietnam, we must take into account the unique character of that conflict. Since what we are facing is a systematic campaign of terror and subversion, supported and directed from without, there are no established lines across which armies face armies, with each side having well defined contiguous areas under its control. Instead, the territory and people in South Vietnam are controlled in varying degrees by the government and by the Viet Cong.[a] Some areas are firmly under the control of the government, some under the control of the Viet Cong, and still other areas are controlled by neither side. This requires that our military efforts in South Vietnam consist of widely dispersed military operations directed at the scattered and changing areas of Viet Cong control.

Our overall policy objective in South Vietnam is a stable and independent government free of external control and externally inspired and supported violence. Our immediate objective is to influence the North Vietnamese to move the conflict from the battlefield to the conference table, or to compel them to desist in their aggression. The basic tasks which flow from these objectives are:

- To support the re-establishment of the authority of the government of South Vietnam over its territory.
- To interdict the flow of men and supplies from North Vietnam to South Vietnam.
- To exert pressure on the government of North Vietnam to cease its direction and support of the insurrection in South Vietnam.

Last year, I outlined for you the concept of military operations which had been developed to carry out these tasks. The ground forces, United States, Korean, Australian, New Zealand, together with the South Vietnamese, were to conduct four major types of operations in South Vietnam which broadly overlapped with one another:

- "Search and destroy" operations, designed to destroy Viet Cong forces and their base areas (supplies, communications and installations). These operations were not intended to seize and hold territory permanently.
- "Clear and secure" operations to eliminate, permanently, residual Viet Cong forces from specified limited areas. These operations were designed to hold territory and were to be undertaken only when it was considered possible to conduct, on a continuing basis, the full range of pacification measures required to secure the area.
- "Reserve reaction" operations, designed to relieve provincial capitals and district towns under Viet Cong attack and to reinforce friendly forces when needed.
- Defense of government centers, including the protection of provincial capitals, district towns, key governmental facilities and installations.

The ground combat units of the regular South Vietnamese forces, together with U. S. and other Free World forces, (i.e., Korean and Australian/New Zealand) were to concentrate on the first type of operation. The South Vietnamese forces, with some assistance from U. S. and other Free World forces, particularly in areas contiguous to their own bases, were to assume primary responsibility for the second type of operations. The third type was to be primarily the responsibility of the South Vietnamese forces with such help as might be required from U. S. and other Free World forces. The fourth type was to be essentially the responsibility of the South Vietnamese forces. . . .

U.S. Forces in Southeast Asia.

At the close of 1966, we had a total of about 383,000 men in South Vietnam, 35,000 in Thailand and 36,000 Navy forces aboard ship off the coast of Vietnam. The number in South Vietnam will continue to increase during the next year and a half, athough at a very much slower rate than during the preceding year and a half. Rising inflation within the Vietnamese economy accompanied the U.S. buildup, and piaster expenditure limitations as well as military requirements had to be considered when establishing these force levels. However, our deployment plans beyond December 1967 are still tentative; the number actually deployed will depend on how the situation evolves over the next 12 months. In this connection, it should be noted that we will have five Army and two Marine Corps division forces in our active central reserve, plus nine in the inactive reserve during this period; and additional aircraft squadrons could also be deployed, if needed.

---

[a] *Throughout this statement the term "Viet Cong" will be used to refer to the forces of the National Liberation Front and of North Vietnam.*

Most of these maneuver battalions in South Vietnam are infantry, airmobile, or airborne; the terrain there does not lend itself to the extensive employment of mechanized and armored units. The distinction among the infantry, airmobile and airborne battalions is more in form than in substance; all three are used in about the same way. Although the nine battalions of the 1st Cavalry Division (Airmobile) have their own helicopters, the infantry and airborne, as well as the Marine Corps battalions, are provided helicopter support as required. Indeed our land forces were supported by about 2,000 Army and Marine Corps helicopters at the end of 1966, and this number will be increased very substantially over the next 12 months. (The Army and Marine Corps units will also be supported by several hundred observation and utility fixed-wing aircraft.)

The extensive employment of helicopters, both for lift and for the suppression of ground fire in the landing zones, is one of the unique aspects of our combat operations in South Vietnam. It has provided our ground forces with an extraordinary degree of mobility and a very effective source of firepower during the critical landing phase. Helicopter losses of 340 in 1966 actually ran considerably below the number projected a year ago. However, we are providing for substantially higher losses in the FY 1967 Supplemental and the FY 1968 Budget because of the much larger number of helicopters expected to be in operation during the period.

Another unique aspect of our ground effort in Vietnam, particularly in view of the absence of an established "front," is the extensive use of artillery. We already have a large number of artillery battalions in South Vietnam and this number will grow substantially within the next 12 months. The 105mm howitzer has proved to be particularly useful in Vietnam since it can be lifted by helicopter and can, in many cases, be used to support patrols on the ground. Together with the large number of mortars provided our forces in South Vietnam, the extensive use of artillery gives them a highly efficient form of close support which has been a decisive factor in many of the battles fought during the last 12 months. . . .

U.S. and other Free World forces in South Vietnam during the September-November 1966 period consumed, on the average, about one million artillery rounds and about 0.7 million mortar rounds per month. We have provided in our FY 1967 Supplemental and the regular FY 1968 Budget for considerably higher consumption rates and the peak monthly production rates will be still higher.

After we have rebuilt our inventories, the production rates will be reduced to the projected consumption levels and held at those levels for as long as may be necessary. Indeed, if the consumption rates should exceed the planned levels, production can be continued at the higher rates. Conversely, if consumption should fall short of our projections, production plans will be adjusted accordingly.

With regard to small arms ammunition, the Free World forces in Vietnam during the September-November 1966 period consumed, on the average, about 100 million rounds per month. We have provided in our Budget for much higher consumption and production rates.

To provide close air support for the ground forces in South Vietnam, interdict the Viet Cong's lines of communication from North Vietnam and attack targets in North Vietnam, we have now deployed a total of about 1,000 fighter and attack aircraft to Southeast Asia, including those on carriers off the coast of Vietnam. This force will be maintained at essentially the same level. . . .

Fighter and attack aircraft losses in calendar year 1966 ran slightly below those projected a year ago, about 500 compared with 524 estimated. We have provided in the FY 1967 Supplemental and the FY 1968 Budget for losses through the entire production lead time, December 1969.

Air ordnance consumption by these forces, including the B-52, the U.S. Army and Marine Corps helicopters and the South Vietnam Air Force, totaled about 56,000 tons in December 1966. The production program reflected in the FY 1967 Supplemental and the FY 1968 Budget will provide for a rate of consumption almost equal to the total air ordnance consumed by U.S. forces in the peak year of World War II in Europe, and almost four times the consumption in the peak of the Korean War. As long as combat operations continue, production rates will be tailored to actual consumption. Following termination of hostilities, production will continue until inventories are built to levels required for a "cold-line" production base. Air ordnance stocks "in-theater" are equivalent to about three and a half months of consumption at current rates.

The U.S. Navy Southeast Asia "offshore" fleet will be maintained at about the current level, i.e., some 90 ships. In addition to the fighter and attack aircraft operating from the three attack carriers which are in combat at any one time, this fleet also provides assault ships for amphibious operations, radar picket destroyers and minesweepers for the Coastal Patrol, seaborne hospital facilities, and fire support for the land forces. During the last half of 1966 about 36,000 round per month of naval gun ammunition (excluding 40mm) were expended. We have provided in our budget for a higher consumption rate.

In addition to the radar picket destroyers and minesweepers, the Coastal Patrol also includes 26 Coast Guard boats and 84 Swift boats engaged in what we call "Market Time" operations. These operations have been quite effective and we believe that very few supplies are reaching the Viet Cong forces by sea. We do believe, however, that a substantial increase in the river control force is required. We now have 120 water jet boats and a number of support ships assigned to this effort, and this force will be substantially increased over the next several months. . . .

To help move the vastly increased cargo to South Vietnam, we have activated about 151 ships from the National Defense Reserve Fleet through December 1966, and the 10 scheduled for activation in the month of January would make a total of 161 activated since June 30, 1965. Together with 11 Government-owned ships already in operation, this will make a total of 172 Government-owned merchant ships available. Along with the ships furnished by the privately-owned fleet, our military sealift operations will amount to about 25 million measurement tons per year, about 14 million tons to Southeast Asia and the Western Pacific and about 11 million tons to all other areas.

MSTS troop transports will continue to be used for the movement of troop units to and from Vietnam but individual replacement personnel will move by air. The Military Airlift Command (including commercial augmentation) is now flying about 25,000 short tons of cargo and 35,000 passengers into Southeast Asia per month. In addition, the Air Force is operating a substantial tactical airlift force in Southeast Asia and the Western Pacific, a total of 23 squadrons and 368 aircraft. . . .

Additional U.S. Force Augmentations.

To support the larger deployments and higher activity rates in Southeast Asia and to provide a more adequate training and rotation base for the longer pull, we have had to increase certain force levels above those reflected in the original FY 1967 Budget. A total of 220,500 military personnel have been added to the Army's FY 1967 end strength, 2,440 to the Marine Corps, 25,520 to the Navy, and 45,240 to the Air Force.

Shown on Table 1 (Supplemental tables begin on page 5) is a recapitulation of the military and civilian personnel strengths as provided in the FY 1967 Budget and, as estimated in the revised FY 1967 Budget, together with the net increase requested in the FY 1967 Supplemental. You will notice we entered the fiscal year with about 104,000 more military personnel than we had originally planned; and we expect to end the year with about 294,000 more. In terms of man-years (i.e., average strength), we expect to have a total of about 236,000 more than provided for in the original FY 1967 Budget; the funds for these additional personnel are included in the Supplemental. . . .

Additional FY 1967 Financial Requirements.

Table 2 provides a summary of the additional funds required by the Defense Department for the balance of FY 1967. The first column, "NOA Enacted," totaling $59,940 million, reflects the amounts enacted by the Congress thus far this fiscal year. The second column, "Transfers and Adjustments," summarizes a large number of mostly small offsetting transactions among the various appropriation accounts. . . .

The third column, "Military and Civilian Pay Supplemental," totaling about $519 million, shows the amounts required to defray the pay increases voted by the Congress last year. The fourth column, "Medicare and Homeowners Assistance Supplemental," totaling $82 million, includes two items: $71 million to help finance the cost of the Military Medical Benefits Amendments Act of 1966 and $11 million to initiate the Homeowners Assistance Program which was authorized by the Demonstration Cities and Metropolitan Development Act of 1966. . . .

The fifth column, "SEA Supplemental," totaling $12,276 million, includes the additional amounts required for the support of our military effort in Southeast Asia during the balance of FY 1967. This is the Supplemental now before the Committee.

Including all the Supplementals and adjustments, total NOA for FY 1967 will amount to about $72,816 million, compared with $59,940 million originally enacted—an increase of $12,875 million.

As shown at the bottom of Table 2, expenditures in FY 1967 are now estimated at $67,950 million, compared with $58,300 million estimated in the original FY 1967 Budget, an increase of $9,650 million. . . .

Procurement.

Included in the Southeast Asia Supplemental is a total of $6,306 million for procurement. In discussing the content of this procurement program, I shall refer to the net change between the original program as set forth in the FY 1967 Budget and the current program, rather than to the details as set in the Supplemental itself. This approach will give you a clearer picture of the revised program. The reason is that during the year, it has been necessary to finance procurement of certain urgently needed Southeast Asia items by transferring funds originally programmed for other purposes. Certain procurement items in the Supplemental bill reflect the restoration of these transferred funds. The total revisions to the procurement program are therefore the net effect of both reprogrammings and the Supplemental. The separate amounts for each of these is shown in the detailed tables I shall refer to shortly. Table 3 gives a summary of the net change in the major procurement categories. You will notice the two major categories are ammunition and aircraft, accounting between them for about $4.4 billion of the total increase in procurement.

Ammunition.

For ammunition, we are requesting a net addition of $677 million, of which 60 percent is for ground munitions and the rest is for air munitions. This Supplemental amount will bring the total for ammunition in FY 1967 to about $4.6 billion, about $600 million more than FY 1966.

In the air munitions category, two of the principal items being increased are 500-lb. bombs and 750-lb. bombs, both of which are carried by the B-52's. We have also included funds for additional air-to-surface antiradiation missiles. Peak production is scheduled to be reached by April. Depending upon actual consumption trends, we now plan to taper off production later this year. However, we have included about $110 million in the Supplemental for advance procurement of long lead time air munitions components in order to retain a capability to increase production to within 10 percent of the April peak in a period of four to six months, if needed. And, we have production capacity in place for even high rates.

With regard to ground munitions, peak production for the 40 major items, accounting for about 85 percent of the tonnage used in Vietnam, will be reached by October of this year. We also have the capability, with a decision lead time of about six months, to raise the production base for ground munitions by an additional 30 percent, if that should ever become desirable. Production is now increasing rapidly, and by July of this year should be close to planned peak rates.

The largest single item of ground ammunition added to the FY 1967 program is $250 million for 105mm artillery ammunition of all types. As I indicated earlier, this weapon is used very extensively throughout Vietnam for a great variety of purposes. Other major items are the 5.56mm cartridge, 60mm mortar rounds and 155mm projectiles.

For ship gun ammunition, a net amount of about $73 million has been added to the original FY 1967 program, offset by decreases in other types of ship-launched munitions. As I noted earlier, our Fleet off the coast of Vietnam is expending about 36,000 rounds per month of naval gun ammunition (excluding 40mm). This consumption must now be replaced.

Aircraft.

Of the $3,715 million added to the FY 1967 program for aircraft, about $1,525 million is for the replacement of future combat losses. Included for the Navy and the Marine Corps are F–4's, A–4's, A–6A's and UH–1E's, a total of 431 aircraft. For the Air Force (including the South Vietnamese Air Force) we have added F–4's, F–5's and A–37's, a total of 175 aircraft. The apparent imbalance between the Navy and the Air Force add-ons simply reflects the fact that a large number of aircraft were provided for the Air Force in the FY 1966 program. Furthermore, another large quantity of tactical fighter and attack aircraft are provided for the Air Force in the FY 1968 program. For the Army, the major addition for attrition consists of UH–1's.

We have also added large numbers of aircraft for training, for example, 582 helicopters for the Army and 174 fixed-wing aircraft for the Air Force. With regard to the Navy and Marine Corps, we have rearranged the trainer aircraft program by adding 50 TA–4F's, 36 T–2B's, and 9 TC–4C's, and deleting 58 T–28's and 20 TH–1E's.

A sizable number of AH–1G's (armed UH–1's) were added for the equipping of new Army aviation units; and an additional quantity of AH–1G was substituted for an equal number of UH–1's included in the original program. Other additions to the procurement program stem from force changes related to Southeast Asia needs. For example, in order to augment the Tactical Air Control Forces and the Special Air Warfare Forces, 176 0–2A's are being added to the Air Force's FY 1967 procurement program. In total, some $440 million has been added to the FY 1967 Budget for these purposes.

In summary, the net increase for the Army is 936 aircraft, the Navy and Marine Corps 427, and the Air Force 425—for a total of 1,788.

Almost $1 billion has been added to the FY 1967 Budget for additional aircraft spares. The original FY 1967 program provides for spares consumption only through June 1967; we are now requesting funds to finance the full production lead time, which in many cases extends through December 1968. Other aircraft equipment, both ground and airborne, accounts for about $755 million of the increase in the FY 1967 Budget.

The net increase of $1,927 million for vehicles, electronics and communications and other equipment is to provide both for the replacement of equipment to be attrited in Southeast Asia in the future and for the equipping of new units.

Research, Development, Test and Evaluation (RDT&E).

The additional amounts required for RDT&E are shown on Table 2. While support of limited war requirements has for years been an essential part of our research and development program, in order to ensure that the research and development program would be fully responsive to the needs of the forces in Southeast Asia, Project PROVOST (Priority Research and Development Objectives for Vietnam Operations) was established in late 1965. PROVOST is designed to identify those programs or projects which have significant potential for near term application to the Vietnam conflict so that they may be accorded the necessary priority. By their very nature, these requirements cannot be foreseen and to the extent that additional funds are needed, they must be obtained by reprogramming, by use of emergency funds, or by new appropriations. . . .

During FY 1967, we have continued, wherever possible, to reprogram or draw on the Emergency Fund. However, almost all of the FY 1967 Emergency Funds have now been used and there remain a number of urgent projects for which there is no foreseeable source of financing other than new appropriations. Accordingly, we have included $135 million in the FY 1967 Supplemental for this purpose. Broadly speaking, the additional projects to be financed in FY 1967 fall into three categories. Efforts in the first category are concerned with improving the ability of our forces to fight at night, efforts in the second category, with reducing aircraft combat losses, and efforts in the third category, with the development of counter-infiltration systems and weapons.

Military Construction.

The FY 1967 Supplemental includes $625 million for Military Construction; $398 million for projects in South Vietnam, $109 million in Thailand, $32 million in other Pacific areas, $75 million in the United States and $10 million for planning. Of the $398 million for South Vietnam, $126 million is required to cover cost overruns on previously approved projects originally estimated to cost $868 million. Since $77 million from the DOD FY 1966 military construction contingency fund has already been applied to these projects, the total cost overrun would be $203 million, or 23 percent of the original estimate. Another $88 million is for personnel facilities, $49 million for airfields, $29 million for utilities, $15 million for harbor dredging, $10 million for facilities related to the relocation of U.S. personnel from Saigon and $81 million for a large number of other operational, supply and support facilities.

The $109 million requested for Thailand includes $10 million for cost overruns on previously approved projects (i.e., five percent of the original estimate), $10 million for port facilities, $19 million for roads from the Port of Sattahip to various military installations in Thailand, $10 million for utilities, $7 million for personnel facilities and $53 million for other operations, supply and support facilities.

The $32 million requested for other Pacific areas includes $5.4 million for ship repair facilities, $9 million for airfield facilities (including a cost overrun of $3 million for previously approved projects in Taiwan), $3 million for POL storage, $2.3 million for hospital improvements (primarily air conditioning in Japan) and $12 million for maintenance, communications utilities and other support facilities.

The $75 million requested for projects in the United States includes $51 million for training facilities (Navy aviation, Army and Marine helicopter training, and Seabee training), $5 million for Military Airlift Command facilities, $7.3 million for personnel facilities (primarily Marine Corps), and the balance for a large number of relatively small facility improvements throughout the country. . . .

Additional Authorizations.

The additional amounts requested to be authorized for aircraft, missiles, naval vessels, tracked combat vehicles and RDT&E are shown in Tables 4, 5 and 6.

Table 1

Recapitulation of Military and Civilian Personnel Strength

FY 1967

	Original FY 1967 Budget			Revised FY 1967 Budget			Change		
	Begin	End	Average	Begin	End	Average	Begin	End	Average
Active Duty Military Personnel									
Army	1,159,043	1,233,693	1,206,574	1,199,046	1,454,200	1,368,233	+ 40,003	+220,507	+161,659
Navy	723,723	727,873	724,151	744,469	753,394	748,938	+ 20,746	+ 25,521	+ 24,787
Marine Corps	250,079	278,184	272,596	261,687	280,624	277,545	+ 11,608	+ 2,440	+ 4,949
Air Force	854,498	853,359	855,419	886,350	898,600	900,136	+ 31,852	+ 45,241	+ 44,717
Total	2,987,343	3,093,109	3,058,740	3,091,552	3,386,818	3,294,852	+104,209	+293,709	+236,112
Direct Hire Civilian Personnel									
Army	359,632	357,923	360,066	371,121	426,164	393,998	+ 11,489	+ 68,241	+ 33,932
Navy (including USMC)	357,601	362,893	359,394	356,744	398,608	381,189	−857	+ 35,715	+ 21,795
Air Force	301,378	308,717	308,986	306,911	319,462	319,349	+ 5,533	+ 10,745	+ 10,363
Defense Agencies	68,505	63,848	63,561	68,923	72,361	71,256	+ 418	+ 8,513	+ 7,695
Total	1,087,116	1,093,381	1,092,007	1,103,699	1,216,595	1,165,792	+ 16,583	+123,214	+ 73,785

Table 2

Financial Summary of FY 1967 Budget Including the Proposed Supplemental for Southeast Asia

(In Thousands of Dollars)

	NOA Enacted	Transfers and Adjustments	Military and Civilian Pay Supplemental	"Medicare" and "Homeowners Assistance" Supplemental	S.E.A. Supplemental	Total NOA
	(1)	(2)	(3)	(4)	(5)	(6)
MILITARY PERSONNEL						
Military Personnel, Army	6,164,400	4,164	78,500	--	650,500	6,897,564
Military Personnel, Navy	3,652,100	−4,164	77,700	--	220,800	3,946,436
Military Personnel, M.C.	1,183,200	--	24,300	--	58,400	1,265,900
Military Personnel, A.F.	5,015,800	--	106,300	--	403,700	5,525,800
Reserve Personnel, Army	288,211	--	6,200	--	14,900	309,311
Reserve Personnel, Navy	112,600	--	800	--	--	113,400
Reserve Personnel, M.C.	36,500	--	800	--	--	37,300
Reserve Personnel, A.F.	69,700	--	1,100	--	--	70,800
Nat'l Guard Personnel, Army	346,533	--	8,520	--	15,280	370,333
Nat'l Guard Personnel, A.F.	82,000	--	1,910	--	290	84,200
Retired Pay, Defense	1,780,000	--	34,000	--	--	1,814,000
TOTAL—Military Personnel	18,731,044	--	340,130	--	1,363,870	20,435,044
OPERATION AND MAINTENANCE						
Oper. & Maint., Army	5,122,427	33,005	64,000	29,000	1,968,000	7,216,432
Oper. & Maint., Navy	3,980,300	−24,806	42,000	25,000	624,000	4,646,494
Oper. & Maint., M.C.	325,600	−48	2,300	--	96,700	424,552
Oper. & Maint., A.F.	4,943,100	−1,823	49,000	17,000	528,000	5,535,277
Oper. & Maint., Def. Agcs.	806,500	2,517	20,300	--	85,800	915,117
O&M, Army Nat'l Guard	231,000	--	--	--	--	231,000
O&M, Air Nat'l Guard	253,300	--	1,400	--	--	254,700
Nat'l Bd for Prom. R.P., Army	494	--	--	--	--	494
Claims, Defense	25,000	--	--	--	9,000	34,000
Contingencies, Defense	15,000	--	--	--	--	15,000
Ct of Mil Appeals, Defense	600	--	--	--	--	600
TOTAL—Oper. & Maint.	15,703,321	8,844	179,000	71,000	3,311,500	19,273,665
PROCUREMENT						
Proc. of Equip. & Msls, Army	3,483,300	--	--	--	2,130,000	5,613,300
Proc. of A/C & Msls, Navy	1,789,900	−58,000	--	--	1,752,000	3,483,900
Shipbldg. & Conv., Navy	1,756,700	--	--	--	--	1,756,700
Other Procurement, Navy	1,968,300	--	--	--	287,000	2,255,300

Continued on page 18

Table 2 Continued

Financial Summary of FY 1967 Budget Including the Proposed Supplemental for Southeast Asia

(In Thousands of Dollars)

	NOA Enacted (1)	Transfers and Adjustments (2)	Military and Civilian Pay Supplemental (3)	"Medicare" and "Homeowners Assistance" Supplemental (4)	S.E.A. Supplemental (5)	Total NOA (6)
Procurement, M.C.	262,900	--	--	--	253,000	515,900
A/C Proc., Air Force	4,017,300	−4,000	--	--	1,303,000	5,316,300
Missile Proc., Air Force	1,189,500	--	--	--	45,000	1,234,500
Other Proc., Air Force	2,122,600	--	--	--	536,000	2,658,600
Proc., Defense Agencies	51,300	--	--	--	--	51,300
TOTAL—Procurement	16,641,800	−62,000	--	--	6,306,000	22,885,800
RES., DEV., TEST, & EVAL.						
RDT&E, Army	1,528,700	27,998	--	--	40,000	1,596,698
RDT&E, Navy	1,758,600	115,436	--	--	40,000	1,914,036
RDT&E, Air Force	3,112,600	23,151	--	--	33,000	3,168,751
RDT&E, Defense Agencies	459,059	1,781	--	--	22,000	482,840
Emergency Fund, Defense	125,000	−106,805	--	--	--	18,195
TOTAL—RDT&E	6,983,959	61,561	--	--	135,000	7,180,520
MILITARY CONSTRUCTION						
Military Constr., Army	114,014	--	--	--	288,500	402,514
Military Constr., Navy	126,918	--	--	--	140,000	266,918
Military Constr., A.F.	205,495	--	--	--	196,000	401,495
Military Constr., Def. Agcs.	7,547	440	--	--	--	7,986
Military Constr., Army Res.	--	--	--	--	--	--
Military Constr., Naval Res.	5,400	--	--	--	--	5,400
Military Constr., A.F. Res.	3,600	--	--	--	--	3,600
Military Constr., Army N.G.	--	--	--	--	--	--
Military Constr., Air N.G.	9,400	--	--	--	--	9,400
Loran Stations, Defense	--	--	--	--	--	--
TOTAL—Military Constr.	472,374	440	--	--	624,500	1,097,314
FAMILY HOUSING						
Family Housing, Defense	507,196	--	--	--	--	507,196
Homeowners Assistance, Defense	--	--	--	11,000	--	11,000
CIVIL DEFENSE						
O&M, Civil Defense	66,100	−1	--	--	--	66,099
Resch., Shltr. Surv. & Mark., C.D.	35,000	--	--	--	--	35,000
Constr. of Facilities, C.D.	--	--	--	--	--	--
TOTAL—Civil Defense	101,100	−1	--	--	--	101,099
SPECIAL FOREIGN CURRENCY PROGRAM	7,348	--	--	--	--	7,348
REVOLVING FUNDS						
Army Stock Fund	--	--	--	--	351,000	351,000
Navy Stock Fund	--	--	--	--	77,000	77,000
Defense Stock Fund	--	--	--	--	107,000	107,000
TOTAL—Revolving Funds	--	--	--	--	535,000	535,000
DEPARTMENT OF DEFENSE TOTALS						
Department of the Army	17,279,079	65,167	157,220	29,000	5,458,180	22,988,646
Department of the Navy	16,959,018	28,418	147,900	25,000	3,548,900	20,709,236
Department of the Air Force	21,024,395	17,328	159,710	17,000	3,044,990	24,263,423
Defense Agencies	3,784,550	−102,069	54,300	11,000	223,800	3,971,581
Civil Defense	101,100	−1	--	--	--	101,099
TOTAL—Military Functions	59,148,142	8,842	519,130	82,000	12,275,870	72,033,984
Military Assistance	792,000	−10,425	--	--	--	781,575
TOTAL NOA—DOD	59,940,142	−1,583	519,130	82,000	12,275,870	72,815,559
TOTAL EXPENDITURES—DOD	58,300,000	--	505,000	61,000	9,084,000	67,950,000

Table 3

Net Additions to the FY 1967 Procurement Program for Southeast Asia

($ millions)

	Army	Navy and Marine Corps	Air Force	Total
Ammunition	309	89	279	677
Aircraft				
Combat Attrition	14	1073	438	1525
Training and Other	258	135	46	439
Spares	149	314	533	996
Other A/C Equipment	169	329	257	755
Total Aircraft	590	1851	1274	3715
Vehicles	288	167	51	506
Electronics and Communications	326	102	141	569
Other	619	131	110	852*
Net Change in Program (TOA)	2130	2340	1855	6317*
Financing Adjustments	--	−48	+29	−11*
FY 1967 Supplemental (NOA)	2130	2292	1884	6306

---

* Reflects $8 million reduction in Procurement, Defense Agencies program.

Note: Detail may not add to totals due to rounding.

Table 4

Amounts Requested for Aircraft, Missiles, Ships and Tracked Combat Vehicle Procurement Authorization in FY 1967 Supplemental Request

($ In thousands)

	Authorized FY 1967	Appropriated FY 1967	Supplemental (NOA) FY 1967
Aircraft			
Army	612,400	612,400	533,100
Navy and Marine Corps	1,434,200	1,422,200	1,703,300
Air Force	4,041,300	4,017,300	1,303,000
Missiles			
Army	510,000	510,000	6,100
Navy	367,700	367,700	48,700
Marine Corps	17,700	17,700	2,100
Air Force	1,189,500	1,189,500	45,000
Naval Vessels			
Navy	1,901,800	1,756,700	--
Tracked Combat Vehicles			
Army	359,200	359,200	62,200
Marine Corps	3,700	3,700	4,200
Totals	10,437,500	10,256,400	3,707,700

Table 5

Source of Funds for Aircraft, Missiles, Ships and Tracked Combat Vehicles FY 1967 Supplemental Procurement Program

($ In thousands)

	Total FY 1967 Program	Funding Available for Financing Program in Part	NOA Requested for Authorization
Aircraft			
Procurement of Equipment and Missiles, Army	1,202,100	669,000	533,100
Procurement of Aircraft and Missiles, Navy (and Marine Corps)	3,462,800	1,759,500	1,703,300
Aircraft Procurement, Air Force	5,685,400	4,382,400	1,303,000
Sub-Total—Aircraft	10,350,300	6,810,900	3,539,400
Missiles			
Procurement of Equipment and Missiles, Army	560,500	554,400	6,100
Procurement of Aircraft and Missiles, Navy	323,300	274,600	48,700
Procurement, Marine Corps	31,100	29,000	2,100
Missile Procurement, Air Force	1,284,500	1,239,500	45,000
Sub-Total—Missiles	2,199,400	2,097,500	101,900
Naval Vessels			
Shipbuilding and Conversion, Navy	2,041,000	2,041,000	--
Tracked Combat Vehicles			
Procurement of Equipment and Missiles, Army	508,900	446,700	62,200
Procurement, Marine Corps	18,400	14,200	4,200
Sub-Total—Tracked Combat Vehicles	527,300	460,900	66,400
GRAND TOTAL	15,118,000	11,410,300	3,707,700

Table 6

Amounts Requested for RDT&E Authorization in FY 1967 Supplemental Request

($ In thousands)

	Authorized FY 1967	Appropriated FY 1967	Supplemental (NOA) FY 1967
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION			
Army	$1,539,500	$1,528,700	$ 40,000
Navy (including the Marine Corps)	1,801,100	1,758,600	40,000
Air Force	3,118,600	3,112,600	33,000
Defense Agencies	459,059	459,059	22,000
Emergency Fund	125,000	125,000	0
Total	$7,043,259	$6,983,959	$135,000

Desert Bonanza

by

Col. I. R. Perkin

Bonanza is a word calculated to stir the imagination. Coined in early gold rush days to connote unusually rich ore strikes, it is now a colloquialism for any source of wealth or high profit. In this sense, the Defense Department enjoys a real bonanza in the Military Aircraft Storage and Disposition Center (MASDC).

Situated in the heart of the copper mining region of the Southwest, where, symbolically enough, many an actual bonanza was struck, this airpower arsenal is daily yielding a rich harvest of aircraft and parts. Currently, over 4,000 used aircraft are stored in its vast, sprawling, desert warehouse—a 3,000-acre warehouse without a roof—located near Tucson, Ariz. Originally conceived in 1946 as a minimum-cost outdoor storage depot for surplus World War II bombers and fighters, it has since grown in size and scope and developed sufficient commonality of functions to warrant merging of similar Navy and Army operations.

To achieve such consolidation, DOD in 1964 elected to close Litchfield Naval Air Station, performing like Navy work near Phoenix, Ariz., and to centralize activities at one place. This action, initially scheduled for completion by July 1967, is proceeding ahead of schedule. As a consequence, and with the recent addition of Army workloads, DOD now centrally manages the storage, distribution and reclamation of all its excess military aircraft at Davis-Monthan AFB, Ariz.

The Department of the Air Force is designated single manager; the Air Force Logistics Command (AFLC) is charged as executive agent; and actual operations are carried out by MASDC, a field agency of AFLC.

A unique, one-of-its-kind organization, MASDC's mission might best be described as "aeronautical geriatrics" —the care and maintenance of elderly aircraft. These oldsters have frequently demonstrated a healthy emergency capability to either return to active service or contribute "bits and pieces" or parts to keep other aircraft flying. MASDC's real payoff to DOD lies in its expertise in handling the over 51 different types, models and series of these stored, aging veterans.

An expertise which, considering the value of hardware and aircraft returned to the active inventory from desert storage in the past five years, contributed to an impressive savings of $42 for every operational dollar spent. In terms of airpower support, the value of the center and its know-how is almost beyond measure. Time and again, in Korea, in Vietnam in massive foreign aid programs, it has paid off by providing a priceless reserve to meet unforeseen needs.

"How do you equate five-to-seven-year lead times," asked a Pentagon visitor, "with this on-the-shelf stockpile?"

The visitor, an Army man, was seeking aircraft to meet urgent, high-priority requirements—a practice which is becoming increasingly common with the U.S. Army Aviation Materiel Command (USAAVCOM). Located in St. Louis and commanded by Brigadier General H. F. Schiltz, this agency, a field activity of the Army Materiel Command, is the focal point for administration of the Army's reclamation and disposal program.

Col. Irving R. Perkin, USAF, is the Commander of The Military Aircraft Storage and Disposition Center, Davis-Monthan AFB, Ariz. His previous assignments were Dir. of Maintenance Engineering at the Middletown and Oklahoma City Air Materiel Areas; and Dir. of Flight Facilities, Europe Africa and Middle East. He is a graduate of the U. S. Military Academy and received a Master of Business Administration degree from the University of Chicago.

It specifically looks to MASDC for aircraft operations involving:

- Receiving, processing and maintenance in storage.
- Removal from storage and preparation for shipment or flyaway.
- Removal of parts or components for inventory replenishment (reclamation) and disposition (sale or transfer of residue).

Since the start of Army support in August 1965, a considerable number of Army aircraft (mostly helicopters) have been processed by MASDC. Significantly, of the approximately million-dollar yield resulting from the first Army reclamation program (44 H–21's), almost half of the materiel recovered went to meet Air Force and Navy inventory requirements.

The Army also acquired 40 stored Navy and Air Force airplanes by transfer—all were prepared for "flyaway" by MASDC personnel.

While present Army support is small and constitutes less than four percent of MASDC's overall workload, the steadily increasing active inventory of Army aircraft presages a heavy future impact on desert storage.

Of the 4,000 aircraft in MASDC's care today, almost 900 belong to the Navy and Marines. The Naval Air Systems Command has overall program jurisdiction over these. Administration is accomplished through the Naval Air Systems Command Representative, Pacific (NAVAIRSYSCOMREP), located in San Diego and headed by Rear Admiral P. A. Holmberg. Additionally, the Navy maintains a Field Service Office at Davis-Monthan AFB.

Transition of the workload from Litchfield Park is virtually complete and Navy support now constitutes some 26 percent of MASDC's total effort. Generally, the merger has gone exceptionally well but for one technical area involving preservation techniques. Faced with severe salt water and salt air corrosion, the Navy has, understandably, developed different preservation methodologies from the Air Force.

Since DOD consolidation directives include a charge to standardize the preservation methodology, and since the state of the art of preservation technology is anything but firm, a field test was decided upon. Complete cocooning has long since been ruled out for long-time storage as impractical, expensive and inefficient—it traps moisture within the airframe which, in turn, induces corrosion.

To determine optimum techniques, Operation Cabbage Patch, a controlled environmental testing program, was begun in October 1965. Controlled by a joint Air Force-Navy team of qualified engineers, a number of representative aircraft are now undergoing extensive desert storage testing. Data derived to date promise equitable resolution of the standardization program within the next two years.

To facilitate overall management and smooth the flow of paperwork and reimbursable accounting, AFLC depends upon formal Interservice Support Agreements. Negotiated and updated annually, these spell out the details governing MASDC's relationships with the Services. These relationships can become quite complex, witness one aircraft transfer situation involving a foreign government, several private contractors (U.S. and foreign), and elements of the U.S. Navy, the U.S. Air Force, the State Department and the Federal Aviation Agency. Unless clear-cut understandings prevail, awkward and needless confusion can upset months of hard diplomatic labor. Conversely, foreign sales and grant aid programs that are well managed and smoothly executed can go a long way toward establishing and maintaining international good will.

As a result of our foreign aid/sales policies, U.S.-built aircraft are now flying in many distant skies. In the past five years, hundreds of MASDC-stored T–28's, C–47's, C–45's, C–119's, C–46's, C–54's, HU–16's, T–33's, F–84's and F–86's have gone to such countries as Argentina, Belgium, Bolivia, Cameroun, Chili, Columbia, Denmark, Ethiopia, France, Guatemala, Iceland, Israel, Italy, Kenya, Nepal, Peru, Somali, Spain and Vietnam. Generally, the aircraft were flown to their destinations after complete revitalization—overhaul, repair and/or modification—and are today in daily use throughout the globe. Some, despite their age, have appreciated considerably in value and are worth more on the open market than was paid for them by the recipient country.

In addition to foreign aid programs, the past five years have seen almost 400 aircraft donated for memorials or transferred to other Government agencies such as National Aeronautics and Space Administration (NASA), the Atomic Energy Commission, Department of Agriculture, U.S. Public Health Service, U.S. Forest Service, U.S. Coast Guard and the Bureau of Fisheries and Wildlife. The aeronautical engineering departments of many schools and universities are also benefiting from classroom and laboratory use of aircraft and engines obtained as excess from the desert bonanza.

Since flyable aircraft in good structural shape best meet operational requirements, MASDC's preservation efforts are chiefly directed toward maintaining its inventory "healthy." Some 65 percent of the current crop can be considered in this category. Of the remainder, 25 percent are in various stages of dismantlement, and 10 percent are shells or hulks, stripped of all useable parts with little chance of being made flyable again.

The benign desert environment with its low moisture and low acidic soil content has proven ideal for storage. It has eased MASDC's load in the discharge of geriatric functions. In many respects, climatic conditions are not unlike those of Cyrenaica in Africa, where the B–24 "Lady Be Good" was found. This World War II bomber, abandoned by its crew after a forced landing in 1943, was discovered and found to be in a remarkable state of preservation after 16 years of exposure to the elements—radios worked, servo motors and hydraulic pumps readily operated, and trapped fuel and oil proved safe for use. Exhaustive laboratory tests by Wright-Patterson AFB personnel of selected components removed from this aircraft have verified the remarkable preservative powers of the desert.

The uses to which hardware stored in MASDC's arid sanctuary can be put are many and varied. Let's look at a few examples of what might be termed "terminal weapon system management."

An ingenious official of the Agency for International Development turned to MASDC for help some time ago when the Indian government ran into difficulties while constructing the Rojasthan Canal. Two-wheel carts that would not sink into sand and could be towed by camels were needed. Using excess wide-tread airplane tires, wheels and axles furnished by MASDC, a thousand simple yet effective "sandbuggies" were constructed which assisted materially in speeding

Veteran aircraft no longer needed for active service are stored in spacious outdoor lots at MASDC near Phoenix, Ariz.

up excavation for this vital Indian lifeline.

A classic example of American ingenuity to support NASA's space effort can also be traced to MASDC's resources. Severe shipment problems had been encountered with missiles built and assembled in West Coast plants but destined for Cape Canaveral shots. Overland shipment was impossible because of rail and highway space and clearance limitations; water shipment was too costly, damaging and time consuming. Turning to MASDC's excess C–97 Stratocruisers as foundations, an enterprising group of engineers were able to construct the mammoth and almost unbelievable "Pregnant Guppy" and, subsequently, the even more unbelievable "Super Guppy." As a consequence, complete, assembled West Coast missiles are housed in these enormous airframes and flown to destination, intact and with minimum time loss, to meet NASA's demanding time schedules.

Additional MASDC support to NASA's space effort has come in the form of excess C–54's and C–121's for satellite ground-station calibration and downrange instrumentation checking. And, to a degree, NASA's research effort is helped by excess KC–97 carcasses, utilized in a special project simulating an orbiting space station.

The list goes on and on—C–45's and C–47's to the Department of Agriculture for development of techniques leading to control of the screw worm fly; a C–47 to the City of New Orleans for its highly successful mosquito control program; low-time J–57 engines from stored B–52's to replace high-time engines; venerable C–47's from desert storage to modification centers for installation of 7.62 miniguns and subsequent assignment to Southeast Asia in key ground support roles; 20mm guns excess to stored Stratojets; 25 J–73 engines to support F–86's of an Air Force Military Assistance Program; C–54 airframes for experimentation in the development and verification of valuable nondestructive testing techniques—the vintaged veterans keep yielding returns limited only by imagination and knowledge of resources.

How can eligible parties participate in this bonanza?

Figure 1 portrays the management control channels for access to MASDC resources. Inquiries concerning sale of surplus aircraft and components should be directed to:

Chief, Defense Surplus Sales Office
Defense Logistics Services Center
P.O. Box 15035
Tucson, Ariz. 85708

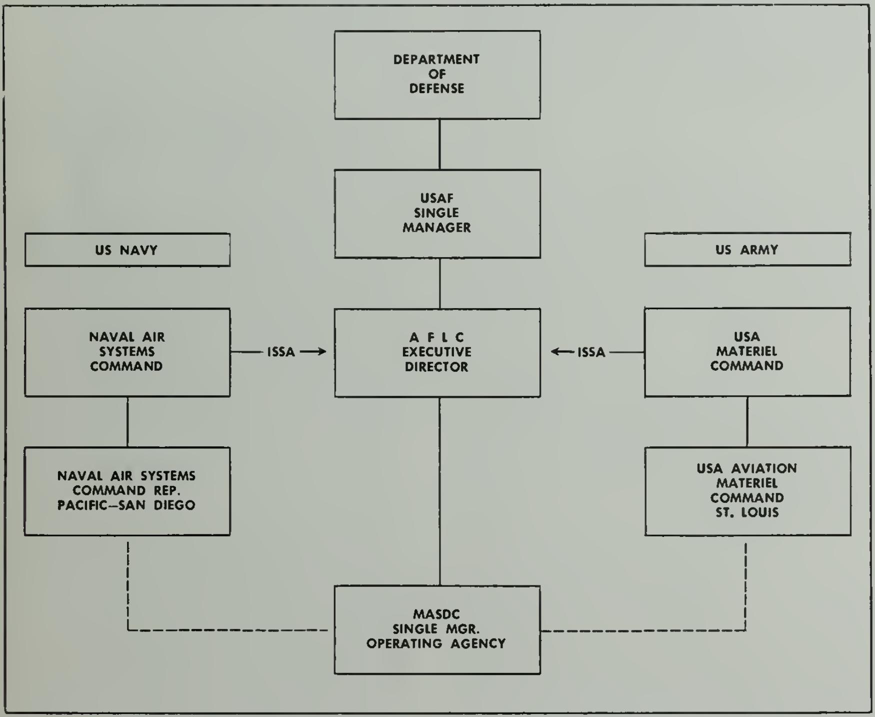

DEPARTMENT OF DEFENSE
USAF SINGLE MANAGER
US NAVY
US ARMY
NAVAL AIR SYSTEMS COMMAND
ISSA
A F L C EXECUTIVE DIRECTOR
ISSA
USA MATERIEL COMMAND
NAVAL AIR SYSTEMS COMMAND REP. PACIFIC–SAN DIEGO
USA AVIATION MATERIEL COMMAND ST. LOUIS
MASDC SINGLE MGR. OPERATING AGENCY

Fig. 1

The Defense Surplus Sales Office, a field activity of the Defense Logistics Services Center, conducts sales of all Army, Navy, Air Force, Marine Corps, Defense Supply Agency and U.S. Coast Guard aircraft on a national basis.

Questions concerning donations, transfers, etc., of aircraft or components may be directed to:

Commander
Military Aircraft Storage and Disposition Center
Davis-Monthan AFB, Ariz. 85707

Inquiries are welcomed, particularly if they involve governmental utilization of parts, equipment, or aircraft which normally would have no further application other than open-market disposition to the highest bidder.

In summary, MASDC is truly a national resource—in terms of stored, on-the-shelf aircraft, in terms of parts support for supply replenishment and in terms of insurance against unforeseen requirements. MASDC's objective is to maximize the return to the Defense Department on this $4.9 billion desert inventory. A used inventory, true, yet one that still retains a strong measure of vitality as auxiliary, secondary, stand-by airpower.

Oriential Characters Now Speedly Reproduced with New Photo Composing Unit

The U.S. Army has purchased two unique ideographic photocomposing machines which will make it possible, for the first time, to prepare copy for printing in the intricate characters of the Japanese, Chinese and Korean languages.

The machines will be used in the production of offset printing plates for the high-speed roll-fed and sheet-fed presses used by the Army.

The machines, which operate similarly to a typewriter, have keyboards on which the ideograph is composed by striking keys corresponding to the various strokes of a character.

The keys generate a code that is used to search the memory drum of the machine. The memory drum then directs the illumination of an ideographic character matrix containing the particular ideograph that has been selected on the keyboard.

The character is displayed on a verification kinescope and, if verified by the operator, is exposed on film. The ideograph is automatically placed in its proper position in relationship to the characters that have already been selected and photographed.

AFSC Announces Organization Changes

The Air Force Systems Command AFSC has made several organizational changes to increase efficiency in staff structure and meet the requirements of the evolving systems and technological changes of the Air Force.

The changes, all of which became effective Feb. 1, 1967, include the creation of a new Deputy Chief of Staff (DCS) for Operations. Brigadier General F. M. Rogers was named as acting DCS for Operations. He will be responsible for all resources planning, including facilities, manpower and organization necessary to insure the continued capability of the command to accomplish its mission. This includes monitoring the test and evaluation of operations of the command.

Another staff change is the reassignment of the functions and responsibilities of the Office of the Deputy Commander for Space to other appropriate staff agencies. For example, those functions formerly carried on by the Deputy Commander for Space which pertain to the development of space systems have been transferred to the DCS for Systems.

In other changes, the DCS for Foreign Technology has been redesignated DCS for Intelligence; DCS/Plans was redesignated DCS/Development Plans; and the office of the Headquarters Commandant was established as a special staff office. DCS/Intelligence will continue to serve as the focal point for monitoring the foreign technology program. Also, the General Accounting Office Activities function was assigned to the DCS/Procurement and Production.

Bids Invited on New Weather Computers

Ten computer manufacturers have been invited by the Air Force Systems Command's Electronic Systems Division (ESD) to submit proposals for replacement of electronic data processing equipment at Offutt AFB, Neb., to be used in the automatic processing of weather information.

The replacement equipment, according to Col. Sylvester P. Steffes, head of the EDP Equipment Office of ESD, will be used by the Air Weather Service of the Military Airlift Command.

Equipment will consist of four interconnected computer systems and will replace two IBM 7094–I computers, two IBM 1401 computers, and one International Telephone & Telegraph Company computer commonly referred to as ADX 7300.

The four systems must be installed in a time-phased schedule calling for the first to be operational in January 1968, the second in April 1968, the third in July 1968, and the last one in August 1968.

Vendors will be asked to demonstrate equipment and software proposed for the system. During the live test demonstration, vendors will be required to compile and execute FORTRAN programs. In addition, they will be required to demonstrate their ability to run present operational programs on the proposed equipment through the use of emulation, simulation, or translation techniques.

Invited to submit proposals for the project were: Control Data Corp.; Electronics Associates; General Electric; General Precision; I.B.M.; National Cash Register Co.; Philco; R.C.A.; Scientific Data Systems; and UNIVAC Division of the Sperry Rand Corp.

Re-Entry Communications Blackouts Studied

The Air Force is conducting a series of six experiments to study space re-entry communication "blackout" by measuring the plasma noise—similar to the hissing sound of a radio turned between stations—which can interrupt radio communications with an object re-entering the earth's atmosphere.

To study noise caused by plasma, which is formed by the breaking up of molecules from intense heat generated by friction with the atmosphere, a 60-pound experiment package will be boosted to an altitude of 200 miles by a four-stage Trailblazer rocket.

The package will then turn and be blasted back toward the earth. When the payload passes the altitude where noise begins (about 300,000 feet) it will be traveling some 12,000 miles an hour.

Instruments inside the nose cone will sample noise at the front, center and back sections. Telementry will be recorded making recovery of the nose cone unnecessary.

The six experiments are being launched for the Air Force by the National Aeronautics and Space Administration from Wallops Island, Va., and will be concerned with techniques of achieving continuous communication during re-entry.

The Ohio State University Research Foundation has been awarded a $80,000 contract by the Air Force Avionics Laboratory for the experiments. The Avionics Laboratory is part of the Research and Technology Division of the Air Force Systems Command.

Prototype of Deep Ocean Rescue Craft Due in June 1968

The first operational prototype of the Navy's new Deep Submergence Rescue Vehicle (DSRV) is scheduled to be delivered in June 1968. The new vessel will provide the Navy with on-the-scene submarine rescue capability anywhere in the world within 24 hours.

The DSRV is 49 feet long and is designed to rescue 24 crewmembers at a time from a distressed submarine. It will be capable of performing rescue missions at depths of up to 3,500 feet.

The spheres, each seven and a half feet in diameter, are connected side-by-side. The middle sphere has a bottom opening that leads down to the distressed submarine. Openings are also on each side allowing access to the other two spheres.

Rescued crewmen are placed in either the right or left sphere and the center one. The third sphere is used for controls and houses pilot, co-pilot and medical corpsman.

New Antenna Concept Tested by AFCRL

A novel new antenna, that may well become the prototype of a new class of antennas, is now under construction by the Air Force Cambridge Research Laboratories, Bedford, Mass.

The antenna covers some 90 acres and consists of an array of 130 dipoles set roughly in a circle measuring 2,040 feet in diameter. The antenna is being built at Sudbury, Mass., and will be ready for tests in the spring of 1967.

Performance of the antenna will be distinguished by its high angular resolution. Resolution is expected to be four times that of the Rayleigh criteria, which says that for an antenna with a given aperture and operating frequency, targets must have a certain separation before they are resolved. This high resolution, in turn, carries with it the implication of greatly enhanced target discrimination capability, a major Air Force operational goal.

The antenna operates somewhat like an interferometer. Phase and amplitude of a signal reaching pairs of dipoles are compared, and these, in turn, are correlated with the phase and amplitude of signals reaching other dipole pairs.

After performance of the antenna has been evaluated, it will be turned over to the Space Physics Laboratory as a permanent radio astronomy facility. Its relatively low frequency of about 6.5 MHz, where radio observations with high resolution telescopes have not been possible in the past, will give radio astronomers a unique research tool.

ABOUT PEOPLE

DEPARTMENT OF DEFENSE

Dr. Peter A. Franken was appointed Dep. Dir., Advanced Research Projects Agency, Jan. 30.

Charles A. Fowler has been named Dep. Dir., Defense Research and Engineering for Tactical Warfare Programs.

Brig. Gen. William R. Kraft Jr., USA, has been designated Dir., Western Hemisphere Region, Office of the Asst. Secretary of Defense (International Security Affairs).

New assignments at the Defense Communications Agency include **Col. John P. Walsh**, USAF, Chief, Research and Development Div., and **Col. Clinton A. Parrish Jr.**, USAF, Project Manager, AUTODIN Project.

Col. Chelsie R. Fincher, USAF, has been assigned as Dep. Commander, Subsistence Regional Headquarters, Defense Personnel Support Center, Brooklyn, N.Y.

Col. William L. Phillips, USAF, has been assigned as Dir., Commodity Procurement and Production, Defense Fuel Supply Center.

Capt. Edward C. Oldfield Jr., USN, has been reassigned as Dep. Commander, Defense Industrial Supply Center, Philadelphia, Pa.

DEPARTMENT OF THE ARMY

Maj. Gen. John Norton has been named to relieve **Brig. Gen. Howard F. Schiltz** as Commanding General, U.S. Army Aviation Materiel Command, St. Louis, Mo.

Dr. Colin M. Hudson has assumed duties as Dep. for Research and Engineering and Chief Scientist at the U.S. Army Weapons Command, Rock Island, Ill.

Brig. Gen. Edwin I. Donley has assumed command of the Army Mobility Equipment Command, St. Louis, Mo., relieving **Brig. Gen. Thomas B. Simpson**, who has retired.

Norman L. Comus has been named Dep. Dir, Ground Support Equipment Laboratory, U.S. Army Missile Command, Redstone Arsenal, Ala.

Col. John F. Polk is the new deputy to the Commanding General, U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Md.

Lt. Col. Donald H. Steenburn is the new Chief, Chaparral Management Office, U.S. Army Missile Command, Redstone Arsenal, Ala.

DEPARTMENT OF THE NAVY

RAdm. Robert R. Wooding has relieved **Capt. George E. Fischer** as Commander, Southwest Div., Naval Facilities Engineering Command. Capt. Fischer has resumed duties as Dep. Commander of the division.

RAdm. Harry C. Mason has been assigned as Vice Commander, Naval Electronics Systems Command, from duty as Dep. Commander for Research and Development, Naval Ships Systems Command.

RAdm. J. J. Stilwell will succeed **RAdm. W. F. Petrovic** as Dep. Commander for Shipyard Management, and as Program Director for Shipyard Modernization, Naval Ship Systems Command, in April.

Capt. Floyd W. Gooch Jr., Planning Officer at Portsmouth, N.H., Naval Shipyard, will assume command of the Philadelphia Naval Yard in April.

Capt. Manuel da C. Vincent has relieved **Capt. D. K. Ela**, as Commanding Officer and Dir. of the David Taylor Model Basin, Washington, D.C.

Capt. Sidney Sherwin Jr. has assumed command of the Pearl Harbor Naval Shipyard, relieving **RAdm. E. Alvey Wright**, who has retired. Capt. Sherwin will head the shipyard until a flag officer is ordered to relieve him.

DEPARTMENT OF THE AIR FORCE

Gen. John P. McConnell has been reappointed as Chief of Staff, U. S. Air Force, for a second two-year tour.

Gen. John D. Ryan has been assigned as Commander in Chief, Pacific Air Force, relieving **Gen. Hunter Harris**, who has retired.

Lt. Gen. Joseph J. Nazzaro succeeds Gen. Ryan, as Commander-in-Chief, Strategic Air Command, with concurrent promotion to the grade of general.

Lt. Gen. Keith K. Compton will move from the position of Air Force Dep. Chief of Staff (Plans and Operations) to fill the post of Vice Commander-in-Chief, Strategic Air Command, formerly held by Gen. Nazzaro. **Lt. Gen. Glen W. Martin** has been assigned as Dep. Chief of Staff (Plans and Operations), Hq., USAF.

Maj. Gen. James T. Stewart has been assigned as Dir. of Space in the Office of Dep. Chief of Staff (Research and Development), Hq., USAF.

Maj. Gen. Harold E. Humfeld has been named as Dir. of Maintenance Engineering in the Office of the Dep. Chief of Staff (Systems and Logistics), Hq., USAF.

Maj. Gen. Theodore R. Milton has been nominated for promotion to lieutenant general and assignment as Inspector General of the Air Force.

Brig. Gen. Russell A. Berg has been transferred from duty as Dep. Dir., Manned Orbiting Laboratory Program, to duty as Dir., Office of Space Systems, Office of the Secretary of the Air Force.

New assignments in the Air Force Systems Command are: **Maj. Gen. Charles H. Terhune, Jr.**, Vice Commander, AFSC, from duty as Commander, Aeronautical Systems Div.; **Maj. Gen. Glenn A. Kent**, Dep. Chief of Staff (Development Plans) Hq., AFSC; **Brig. Gen. Walter R. Hedrick Jr.**, Asst. Dep. Chief of Staff (Systems) Hq., AFSC; **Brig. Gen. Felix M. Rogers**, Asst. Dep. Chief of Staff (Development Plans) Hq., AFSC; **Col. John E. Hicks**, Chief, Bio-Chemical Div., Armament Development Laboratory, Air Proving Ground Center, Eglin AFB, Fla.; **Col. Milo L. Seccomb Jr.**, Dir., Cost Analysis, Hq. AFSC; **Col. David E. Galas**, Air Force Plant Representative, Northrop Corp., Hawthorne, Calif.; **Col. James B. Tapp**, Dir., Range Operations, Air Force Western Test Range, Vandenberg AFB, Calif.; and **Col. Richard C. Doom**, Dir., Research and Technology, Space Systems Div.

Assignments in the Office of the Secretary of the Air Force are: **Col. David M. Falk**, Asst. Dep. Dir., Plans and Policy, Office of Space Systems; **Col. Alfred J. Lynn**, Dep. Chief, Information Div., Office of Information. **Col. Carl. G. Schneider**, Executive to the Asst. Secretary of the Air Force (Financial Management); **Col. Byron V. Pepitone**, Executive to the Dep. Under Secretary of the Air Force (Manpower).

Assignments at Hq., USAF, include: **Col. William R. Joyner**, Executive Officer, Dep. Chief of Staff (Systems and Logistics); **Col. Lester E. Manbeck**, Chief, Communications and Electronics Div., Directorate of Aerospace Programs, Dep. Chief of Staff (Programs and Resources); **Col. Joe M. Whitefield**, Asst. for Policy, Dep. Chief of Staff (Systems and Logistics); and **Col. Edward F. Byers**, Chief, Nuclear Power Div., Directorate of Science and Technology, Dep. Chief of Staff, (Research and Development).

Navy Gets New Shark Repellent Device

The Navy has developed a new type of shark repellent device which has successfully passed a series of tests demonstrating that it is effective against various types of sharks.

The new survival gear is a five-foot long plastic bag which screens a man in the water from any sharks that might be in the vicinity. The bag is filled with water and supported by inflatable cuffs or rings attached to the top of the bag. The man, supported by his life jacket, floats inside the bag. This method prevents blood from wounds or other human evidence from being sensed by maneating sharks.

Black in color with orange cuffs, the device can be made of commercially available strong, lightweight, mildew- and decay-proof plastic materials.

FROM THE SPEAKERS ROSTRUM

Exerpt from address by Hon. Robert H. Charles, Asst. Secretary of the Air Force (Installations & Logistics), to the Washington Chapter of the American Ordnance Assn., Washington, D.C., Feb 15, 1967.

Hon. Robert H. Charles

The Problem of Long Lead Time

* * * * * * * * * *

Since most of you are related in one way or another to this country's industrial effort, I would now like to discuss one of our industrial troubles with you, namely, long hardware lead times.

There is nothing good, to us, about long lead times. On the contrary, there are at least three extraordinarily onerous results:

- National defense, particularly when a war is being fought, involves rapidly and almost constantly shifting requirements. After all, we don't do the enemy's planning for him. So if it takes a long time to get a needed product, our response to changed requirements becomes almost glacial in its speed, unless we overbuy in the first place to meet all possible contingencies. This would be unfair to the taxpayer.
- Having ordered a long lead time item, suppose the requirement changes or the volume is reduced after it is 80 percent complete. We then have the agonizing choice of terminating something at 80 percent of its completed cost and receiving nothing, or completing the purchase of a substantially unneeded item. We usually end up doing the latter because it may then be worth 30 percent of its original cost, and the added cost of completion is then only 20 percent.
- This result is perhaps least understood and most insidious. We become locked into a given design over a longer period, thereby inhibiting the incremental incorporation of major improvements, but even more important, of wholly new systems. This results in systems which are at all times less up-to-date and effective than they should be. It also creates a psychological barrier to force modernization. If, being required by long lead times to buy fewer systems but in larger quantities of each, we find ourselves with a very large inventory of an 85 percent effective weapon, there is some resistance to phasing down all those assets, which cost so much in effort, money and time, in order to acquire a 95 percent effective weapon.

In short, long lead times limit our response to changing world conditions and to the rapidly shifting requirements of defense, increase the possibility of accumulating unneeded or obsolescent inventories, and inhibit modernization. So I ask the question: Why should any customer, particularly a customer who is responsible for the national defense, be thus burdened? And if you don't think that this load is a full-feathered albatross, just ponder the problem when the lead time for a fighter increases some 35 percent, as it has, over what was already too long a lead time, i.e., almost a year and a half. This means that in order to be sure to have it if we need it, we must commit ourselves, almost two years before its delivery, to an item which changed conditions may render less effective than we desire even before we get it. And this for an item already in production.

Let me put it in a nutshell: Industrial technology and capacity are part of the lead time problem; and it's time we did something more about it.

Here are two specific suggestions:

- In searching for new and improved technology and manufacturing methods, added emphasis should be placed on increasing the speed of the manufacturing process as well as improving the quality of the product and reducing its cost. Industry should do more of this on its own. The Air Force will, of course, continue to sponsor research in technical areas, particularly where its only application appears to be military. But rare indeed is the new military manufacturing technique or material which does not ultimately find its way into commercial use. We need more new private initiatives in this area.
- Industry should put more of its own money into new and improved tools of production, thereby increasing overall capacity. I can understand a reluctance, without meaningful incentives, to make substantial capital investments in special purpose equipment, or in equipment for temporary or one-shot procurement including wartime surge requirements. But I cannot understand this reluctance if the requirement appears to have reasonable stability in a nonwartime environment, particularly where the new manufacturing equipment can do a better job faster and at lower cost. The airlines do not provide machinery and equipment to the manufacturers of commercial aircraft. Why should the Air Force do so on military programs having reasonable stability? An important feature of the total package procurement concept, under which the C–5 is being built, specified that the manufacturer would furnish all additional facilities for that program, and Lockheed and General Electric are doing so. I should add that, as far as aircraft are concerned, what shortages and increased lead times do exist are more the result of commercial work than of military. For the first time in history, in 1967, more pounds of aircraft will be delivered to commercial users than to the military. Deliveries of new commercial

aircraft are scheduled to spurt from 221 in 1966 to 436 in 1967, and increase of almost 100 percent.

What I am saying is that industry should finance the machinery, equipment and other capital assets not only for its civilian business, but also for its medium to long-range military business.

As indicated earlier, I have made this pitch before. The reaction is reported to be that industry was badly burned by investments during the Korean conflict and now wants a better assurance of use before investing capital in long lead time equipment. That reaction, in my view, misses the mark. I am not talking about temporary or one-shot requirements, such as wartime surges. I am talking about medium to long-range military requirements, and only those, of such items as the C–5, the F–111, the A–7, etc. And speaking of the C–5, I noted with interest, and do not question its accuracy, an industry study which indicated that if a 200,000-ton, closed-die forging press were available today, on 200 C–5's almost $70 million could be saved in manufacturing costs, and an additional $30 million in operating costs due to reduced weight. The total is substantially more than the estimated cost of the press. If this is so on this one program, think how much more would be saved in the next 10 years on all programs, including such commercial projects as the 747 and the supersonic transport. In view of industry's sharing 100 percent in cost reductions on commercial aircraft, and a sizeable amount on military programs—for example, on the C–5 the airframe contractor's share is 50 percent below target and 30 percent above—I ask again why industry does not think it would be in its own best interest to build and operate such equipment.

I am not suggesting that any company, even if it had the resources, should do such a thing by itself. After all, no company knows in advance that it is going to win a major program, and the time to design, build and shake down such facilities is much longer than the period from airplane development go-ahead to cutting of production hardware. What is known, however, is that some company will win each program and that it, and the nation, will benefit from the existence of a facility that can save $98 million on one program. Let me suggest, therefore, that industry consider a consortium to finance, and perhaps operate those facilities that are too expensive for one company prudently to undertake. This would not be new. For example, many years ago when the industry was much smaller and even relatively low speed wind tunnels were in this category, a consortium was formed to build the tunnel at Pasadena.

The next question, of course, is that if the nation will benefit from such facilities, why shouldn't the Government put up the money. The answer is so deeply ingrained in our system that I am surprised it is asked. Without debating its merits vis-a-vis capitalism, let me read to you the first definition of "socialism" in Webster's Unabridged: "A . . . social organization based on . . . governmental ownership . . . of the essential means for the production and distribution of goods." We should all keep this definition in mind. I recognize, of course, that words like "socialism," "capitalism," and "free enterprise" are what might be called "color words." There are few polar choices in this ambiguous world. Nevertheless, there are meaningful distinctions between them; and industry—and the nation—should not expect to continue to reap the benefits of capitalism and free enterprise without shouldering its burdens. We can't have it both ways.

And if you think this is an idle warning, listen to what John Kenneth Galbraith said recently:

> **"The line that now divides public from so-called private organization in military procurement . . . is so indistinct as to be nearly imperceptible. . . . the mature corporation will eventually become a part of the larger administrative complex with the state. In time, the line between the two will disappear. Men will look back in amusement at the pretense that once caused people to refer to General Electric . . . or DuPont as 'private' business."**

Now, listen to the conclusion:

> **". . . and if the mature corporation is recognized to be a part of the state or some penumbra of the state, it cannot plead its inherently private character . . . as cover for the pursuit of goals of primary interest . . ."**

As with all syllogisms—and I do not use the term in derogation—Mr. Galbraith's conclusion is right only if his major premise is right; namely, that mature corporations, particularly in defense business, are becoming part of the state. That premise need not be right. But it will be if defense industry does not become more resourceful in restoring its "inherently private character." I repeat. We can't have it both ways.

Excerpt from address by Capt. R. J. Schneider, USN, Asst. Commander for Research and Technology, Naval Air Systems Command, at Annual Meeting of the American Institute of Aeronautics and Astronautics, Boston, Mass., Nov. 29, 1966.

Capt. R. J. Schneider, USN

Forecast of the Navy Aerospace Posture

* * * * * * * * * * *

The Attack Carrier.

. . . The tactical missions of the carrier have evolved and changed throughout the years and it seems well founded to state that the attack carrier is, and will remain, the backbone of Navy tactical strike capability in the foreseeable future. On the national scale, the attack carrier capability is, and appears to be for the future, one of the major building blocks of the U.S. security posture.

Aircraft weapon systems of the 1970's will probably look much similar to those in and entering the Fleet today. Limited conflict, as well as "police action," in areas remote from the U.S. geographic base, remain as probabilities so that emphasis on relatively conventional weaponry developments is not going to diminish. However, the Navy must also give continuous attention to the possibilities of major nonnuclear and nuclear war. Attack carrier air wings must be capable of carrying out across-the-board strikes against land and sea targets. They must be capable of conducting missions in anti-air, close-air support, reconnaissance, mining and antisubmarine warfare. The ability to conduct these missions under all-weather conditions is improving rapidly. We must go further and essentially turn "night into day" so far as the total effectiveness of our capability is measured.

Fighter and Attack Aircraft.

What are a few of the salient trends and requirements indicated for attack and fighter-attack aircraft and their primary weapons?

The ultimate in aeronuatical performance has certainly not been attained; speed, range, altitude, maneuverability, acceleration, etc., can all be improved. In aircraft weapon systems, however, high performance is only part of total system effectiveness and versatility. Cost effectiveness is not just a comptroller's tool. Reliability and its close relative maintainability are highly important components of availability. Maximum performance, if not available, is no performance at all.

In both fighter and attack aircraft an important objective should be improved target identification, target acquisition, and accurate weapon delivery, on the first pass. Having to stay around for second and third passes throws away a warrior's best defense, surprise, no matter how high his basic aircraft performance may be!

Low-level penetration into highly defended hostile areas markedly improves survivability and we want foolproof, fail-proof terrain-avoidance and terrain-following systems.

Fully effective, multi-mission aircraft are being widely studied. To attain multi-mode capabilities without compromise to any one mission is a technological challenge in almost every aeronautical and avionic specialty. We should be able to get there in the mid- or late 1970's.

Advances in automation, pilot's display and information transfer, man-to-machine and machine-to-man, permit smaller crews. I don't have time to debate pro's and con's of single- versus dual-place aircraft specifically, but man is a very expensive commodity to carry, in weight, vulnerability, training and maintenance costs. Each combat warrior reflects big multipliers back into every aspect of defense management and financing.

Anti-Air Warfare.

Anti-air defense of a naval task force postulates coordinated actions of fighter aircraft and surface-to-air missiles for a "defense-in-depth."

Trends in fighter aircraft development will continue along lines of increased speed, range and endurance. Some versions of the F–4 series aircraft will still be in the Navy inventory. These will carry the up-to-date versions of Sidewinder and Sparrow missiles. The F–111B development offers increased interception range, time on station, and the longer range Phoenix missile capability. Its fire control system provides for multiple target attack.

This airplane and its missile system still must complete various evaluation phases prior to production decisions.

It would seem clear that the advantages of a variable-sweep, "swing-wing" principle, increased air-to-air missile range, and multiple-target track while scan fire control system have been feasibility verified and that next generation developments will go forward from these "bench marks." Again I would emphasize avionic technology improvement by size and weight reduction and reliability and versatility increase as holding the key to improved single or multiple mission effectivity.

The future trends for naval surface-to-air missiles must include coping with faster, smaller, harder targets. We must increase effectiveness against very low altitude targets, in any weather, day or night, and in a full electronic countermeasure environment. We should be able to destroy stand-off weapons as well as their mother aircraft. Point defense systems of small enough size and weight for installation in our lesser ships are becoming feasible. . . .

Air-to-Surface.

Our attention is strongly directed to highly accurate missiles for point targets. Our ultimate objectives include all-weather, day and night guidance, warhead mechanization properly balanced to the target hardness, and appropriate stand-off range for various missions. Present state of the art is well typified in the Walleye and Condor developments.

In ARM (anti-radiation missiles), future descendants of the Shrike family will move towards higher velocity and better guidance features. The strike aircraft going against a hostile defensive guided missile complex is essentially engaged in a rather personalized duel. Winning the draw and having one lesser time to target are the keys to success and survival. When we succeed in gaining relative immunity from the hostile missile defenses, we decrease the requirements for stand-off range, reopen the medium altitudes for use, and reduce the danger from defensive small arms fire.

Rapid strides are being made in all the bit-and-piece technologies: radar and infra-red, low-light level TV, microwave radiometry, miniaturized inertial schemes, explosives, warhead kill mechanization, fuzing and pilot diplays. . . .

Unguided weapons will not become obsolete and here is a fertile field for improvements; bombs, bomblet-clusters, hypervelocity rockets and other weapons of these types have a special place in an armament inventory because of their low price, simplicity, ruggedness in storage, and high cost and system effectiveness for many applications.

Ship-to-Ship/Surface.

A few words should be given to ship armament, specifically referring to the field once dominated by the main battery guns.

There is some development in small bombardment rockets and several light-weight gun systems. We think there is a place for a longer range ship-launched missile system and are presently studying possible adaptation of the Army's Lance missile program.

Advanced Early Warning.

Carrier based early warning and long-range surveillance against both air and surface targets will continue as an important requirement. Something like the E2A aircraft will be needed in our inventory. Improvements in detection range, clutter reduction and data management are most significant to this mission. Fighter direction of long-range interceptors has been incorporated in this mission for some time and experience has suggested secondary control of long-range strike missions as a corollary usage.

Antisubmarine Warfare (ASW)

Antisubmarine warfare remains high in Navy priority. But without some revolutionary breakthroughs in physical science we must continue the slow struggle towards increased efficiency of known effects. Sophisticated signal processing to extract every possible bit of information from each sensor and efficient data processing to correlate each little bit of knowledge is our chore. Integration of the total avionics package and microminiaturization of components is our only present hope to survive the deluge of electronic hardware this stubbornly resistive warfare area requires. It must be reliable equipment or the whole effort is wasted.

Replacement for the aging S–2 design is required during the 1970's and we are planning for it in the VSX concept. This aircraft must embody those trends I have just mentioned and in reduced size follow on in the ANEW pattern of the present P–3 airplane. The many operating functions will be centralized into an integrated display system under computer support for management of the almost infinite detail. But the operator will be aided rather than replaced by the computer. Critical problems of detection, classification and localization are expected to be solved more quickly. Better integration of the various systems is expected to increase probability and accuracy of solution. Aircraft performance will be increased, permitting search of greater area further out from the CVS force and with less transit time.

The same trends observed in the fixed-wing airplane will occur in rotary-wing aircraft. Performance will be increased in the vehicle to achieve higher speed and greater endurance with a heavier payload. Improved systems integration with computer-aided control and display will be the rule. The ability to store data, compare, retrieve and compute will enhance effectiveness in this multisensor environment. Sophisticated signal processing will be more extensive for sonar acquisition and target location. Improved versions of the SH–3 helicopter series will be with us during most of the 1970's with a replacement up for study and development possibly late in the period.

Land-based ASW airplanes of the P–3 series are with us throughout the period. The ANEW concept, pioneered in the land-based P–3, will be improved and extended to all ASW aircraft. Largely because of weight and space considerations, newer development will most likely be proved out first in the larger ASW airplane. More automation of functions with automatic alerting devices for the operators can be forecast. Airframe and engine improvements will increase range and endurance capabilities. A follow-on airplane (VPX) will be studied for the next generation. Perhaps some remarkable discovery or invention will make undersea surveillance as efficient as our present capabilities for keeping track of objects in orbit.

Oceanography.

Closely related to ASW is the ocean environment. Navy interest in total oceanography, or "inner space," is quite natural. We are intensifying our efforts in all aspects of oceanography. Efforts have been under way for several years to predict oceanographic conditions analogous to the way surface weather is forecast. Progress has been made and the results improve ASW operations. Many similarities exist between this inner space and the higher levels of aerospace, at least as to problem areas. Much of the technology which has been developed for human survival in submarines and underwater exploration is immediately applicable to spacecraft life support systems and vice versa.

The vast distances and areas one must cover to collect data and unravel many mysteries of oceanography suggest adding aircraft platforms to the small fleet of surface and deep submergence research vessels now employed. Some specialized instrumentation possibilities are being investigated and others can be expected to exploit the high data-gathering potential of an airborne survey.

Conclusion.

I have necessarily omitted more items than I have mentioned, but there is no particular significance to the omissions except lack of time. Vertical take-off, zero length deck-launch, engine and propulsion innovations, communication, navigation, satellite and other space applications, the list goes on almost without end. These are all important.

Recapitulating some of the more challeneging technological aspects for the future:

Aerodynamics—In pretty good shape overall, though there is a good bit of work to do in the hypersonic speed ranges. Stability and control at these high velocities and also in the zero and very low speed range need some more development.

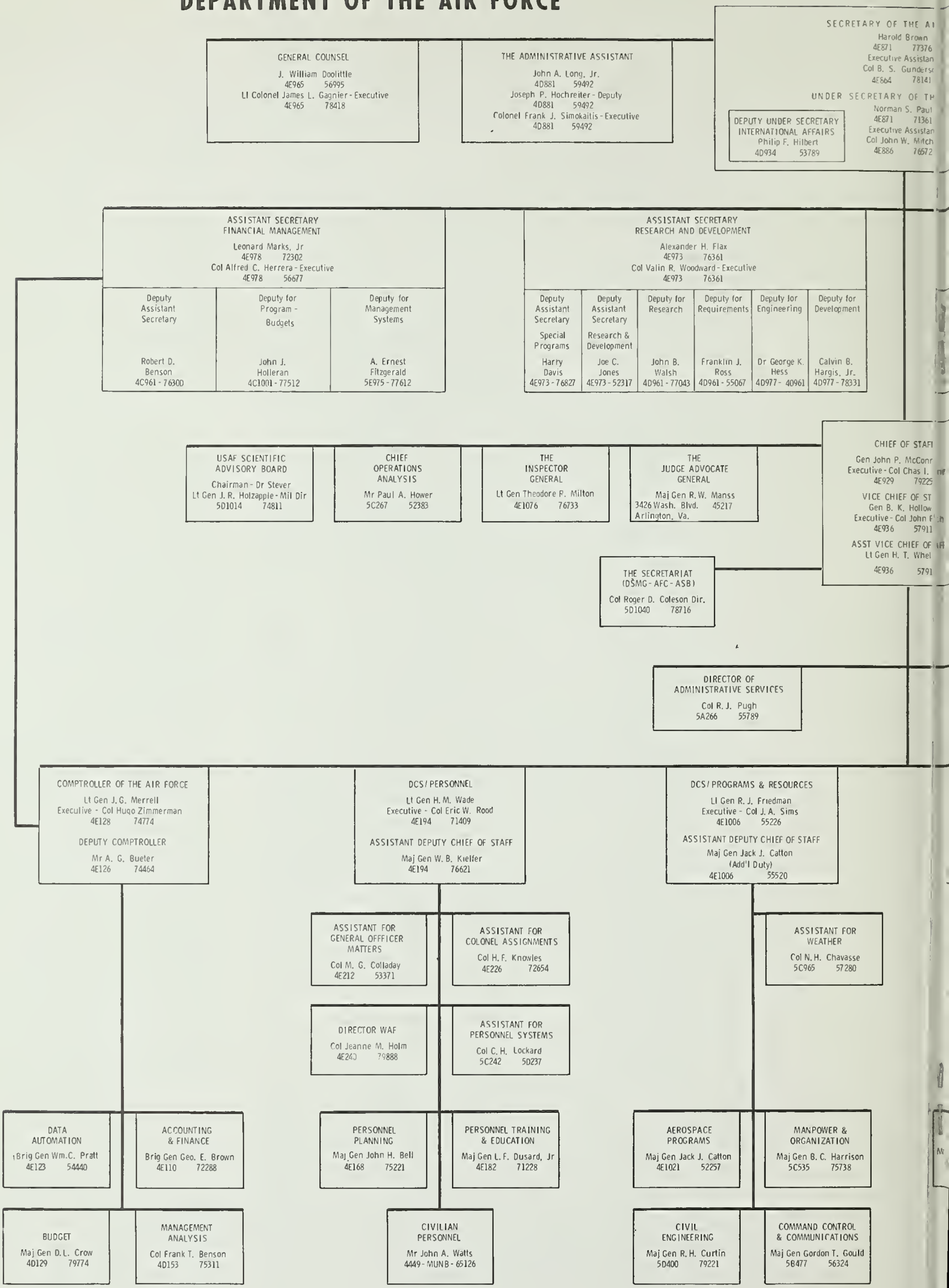
Propulsion—Almost unlimited possibilities for the future. Every advance in thrust-to-weight ratio extends our design capabilities.

Materials and Structures—Despite excellent progress, the demands of new requirements are almost unsatiable. Temperature, weight, strength and stiffness, and fatigue capabilities arbitrarily limit almost every design. Each improvement whets the appetite for more.

Avionics—We want and have to have ultra-complex electronics to meet and improve on almost every military requirement. Yet as technology permits smaller equipment to meet the need, the greater grows the demand to build in still more capability, and for versatility we want it all in every airplane or missile. Weight and size are shrinking at a very satisfactory rate. Now it is time to really get after absolute reliability. We have to get this complex equipment up to the reliability of the main wing structure before it is truly satisfactory.

General—The explosive growth of new technology has in itself become a problem. Each successful experiment points the way to new effort and at the same time raises the question of whether or not to exploit it in military hardware. We must stay alert and balanced with the best possible judgment, between trying to capitalize too soon on some new knowledge versus staying at the research level so long, looking for the last bit of proof, that a technological lead passes to the enemy.

DEPARTMENT OF THE AIR FORCE



GENERAL COUNSEL
J. William Doolittle
4E965 56995
Lt Colonel James L. Gagnier - Executive
4E965 78418

THE ADMINISTRATIVE ASSISTANT
John A. Long, Jr.
4D881 59492
Joseph P. Hochreiter - Deputy
4D881 59492
Colonel Frank J. Simokaitis - Executive
4D881 59492

SECRETARY OF THE A
Harold Brown
4E871 77376
Executive Assistan
Col B. S. Gunders
4E864 78141

UNDER SECRETARY OF TH
Norman S. Paul
4E871 71361
Executive Assistan
Col John W. Mitch
4E886 76672

DEPUTY UNDER SECRETARY
INTERNATIONAL AFFAIRS
Philip F. Hilbert
4D934 53789

ASSISTANT SECRETARY
FINANCIAL MANAGEMENT
Leonard Marks, Jr
4E978 72302
Col Alfred C. Herrera - Executive
4E978 56677

Deputy Assistant Secretary	Deputy for Program - Budgets	Deputy for Management Systems
Robert D. Benson 4C961 - 76300	John J. Holleran 4C1001 - 77512	A. Ernest Fitzgerald 5E975 - 77612

ASSISTANT SECRETARY
RESEARCH AND DEVELOPMENT
Alexander H. Flax
4E973 76361
Col Valin R. Woodward - Executive
4E973 76361

Deputy Assistant Secretary Special Programs	Deputy Assistant Secretary Research & Development	Deputy for Research	Deputy for Requirements	Deputy for Engineering	Deputy for Development
Harry Davis 4E973 - 76827	Joe C. Jones 4E973 - 52317	John B. Walsh 4D961 - 77043	Franklin J. Ross 4D961 - 55067	Dr George K. Hess 4D977 - 40961	Calvin B. Hargis, Jr. 4D977 - 78331

USAF SCIENTIFIC
ADVISORY BOARD
Chairman - Dr Stever
Lt Gen J. R. Holzapple - Mil Dir
5D1014 74811

CHIEF
OPERATIONS
ANALYSIS
Mr Paul A. Hower
5C267 52383

THE
INSPECTOR
GENERAL
Lt Gen Theodore R. Milton
4E1076 76733

THE
JUDGE ADVOCATE
GENERAL
Maj Gen R. W. Manss
3426 Wash. Blvd. 45217
Arlington, Va.

CHIEF OF STAF
Gen John P. McConn
Executive - Col Chas I.
4E929 79225
VICE CHIEF OF ST
Gen B. K. Hollow
Executive - Col John F
4E936 57911
ASST VICE CHIEF OF
Lt Gen H. T. Whel
4E936 5791

THE SECRETARIAT
(DSMG - AFC - ASB)
Col Roger D. Coleson Dir.
5D1040 78716

DIRECTOR OF
ADMINISTRATIVE SERVICES
Col R. J. Pugh
5A266 55789

COMPTROLLER OF THE AIR FORCE
Lt Gen J. G. Merrell
Executive - Col Hugo Zimmerman
4E128 74774
DEPUTY COMPTROLLER
Mr A. G. Bueter
4E126 74464

DCS/PERSONNEL
Lt Gen H. M. Wade
Executive - Col Eric W. Rood
4E194 71409
ASSISTANT DEPUTY CHIEF OF STAFF
Maj Gen W. B. Kielfer
4E194 76621

DCS/PROGRAMS & RESOURCES
Lt Gen R. J. Friedman
Executive - Col J. A. Sims
4E1006 55226
ASSISTANT DEPUTY CHIEF OF STAFF
Maj Gen Jack J. Catton
(Add'l Duty)
4E1006 55520

ASSISTANT FOR
GENERAL OFFFICER
MATTERS
Col M. G. Colladay
4E212 53371

ASSISTANT FOR
COLONEL ASSIGNMENTS
Col H. F. Knowles
4E226 72654

ASSISTANT FOR
WEATHER
Col N. H. Chavasse
5C965 57280

DIRECTOR WAF
Col Jeanne M. Holm
4E240 79888

ASSISTANT FOR
PERSONNEL SYSTEMS
Col C. H. Lockard
5C242 50237

DATA
AUTOMATION
Brig Gen Wm.C. Pratt
4E123 54440

ACCOUNTING
& FINANCE
Brig Gen Geo. E. Brown
4E110 72288

PERSONNEL
PLANNING
Maj Gen John H. Bell
4E168 75221

PERSONNEL TRAINING
& EDUCATION
Maj Gen L. F. Dusard, Jr
4E182 71228

AEROSPACE
PROGRAMS
Maj Gen Jack J. Catton
4E1021 52257

MANPOWER &
ORGANIZATION
Maj Gen B. C. Harrison
5C535 75738

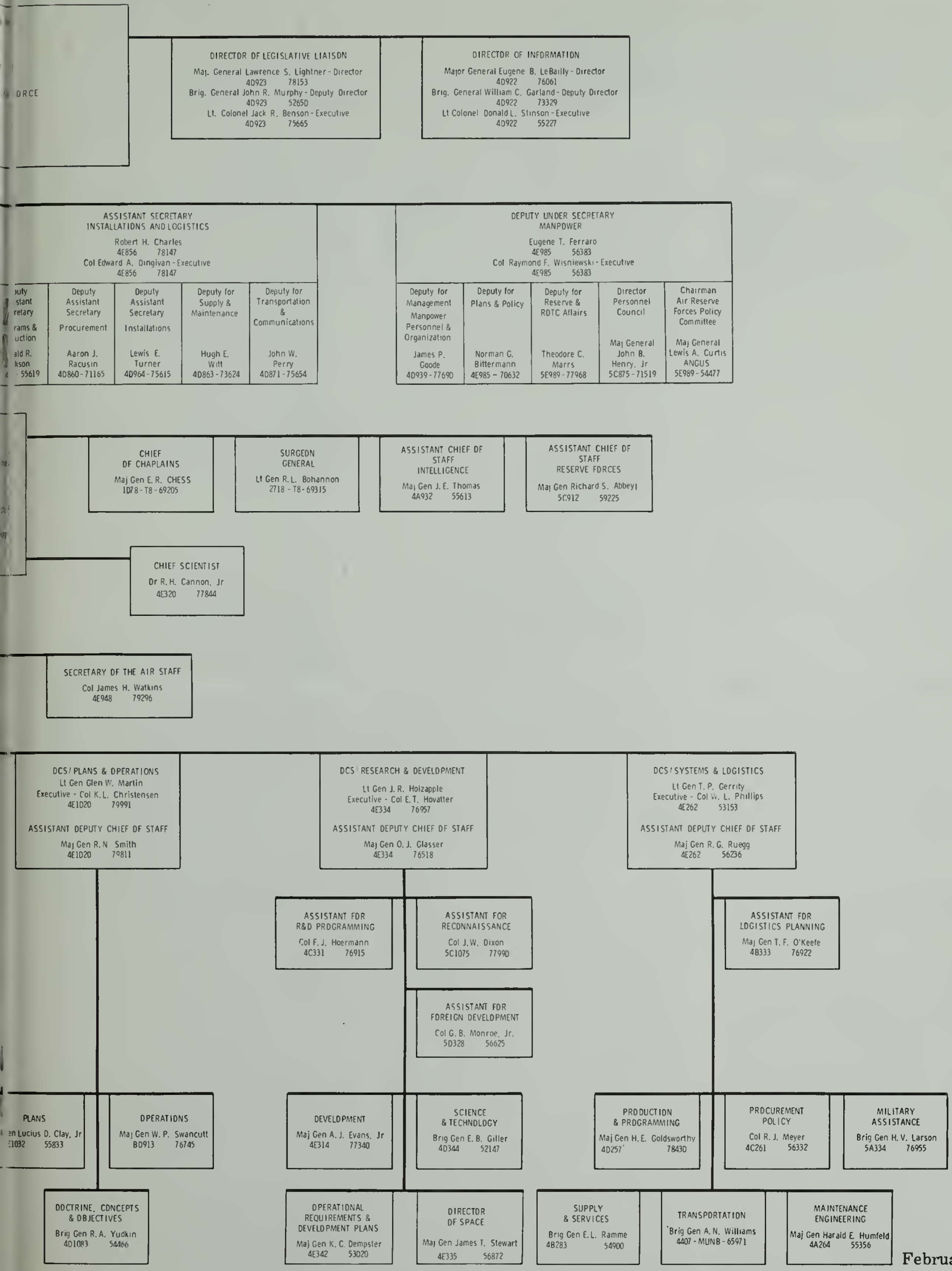
BUDGET
Maj Gen D. L. Crow
4D129 79774

MANAGEMENT
ANALYSIS
Col Frank T. Benson
4D153 75311

CIVILIAN
PERSONNEL
Mr John A. Watts
4449 - MUNB - 65126

CIVIL
ENGINEERING
Maj Gen R. H. Curtin
5D400 79221

COMMAND CONTROL
& COMMUNICATIONS
Maj Gen Gordon T. Gould
5B477 56324



ORCE

DIRECTOR OF LEGISLATIVE LIAISON
Maj. General Lawrence S. Lightner - Director
4D923 78153
Brig. General John R. Murphy - Deputy Director
4D923 52650
Lt. Colonel Jack R. Benson - Executive
4D923 75665

DIRECTOR OF INFORMATION
Major General Eugene B. LeBailly - Director
4D922 76061
Brig. General William C. Garland - Deputy Director
4D922 73329
Lt Colonel Donald L. Stinson - Executive
4D922 55227

ASSISTANT SECRETARY
INSTALLATIONS AND LOGISTICS
Robert H. Charles
4E856 78147
Col Edward A. Dingivan - Executive
4E856 78147

outy stant retary rams & uction ald R. kson - 55619	Deputy Assistant Secretary Procurement Aaron J. Racusin 4D860 - 71165	Deputy Assistant Secretary Installations Lewis E. Turner 4D964 - 75615	Deputy for Supply & Maintenance Hugh E. Witt 4D863 - 73624	Deputy for Transportation & Communications John W. Perry 4D871 - 75654

DEPUTY UNDER SECRETARY
MANPOWER
Eugene T. Ferraro
4E985 56383
Col Raymond F. Wisniewski - Executive
4E985 56383

Deputy for Management Manpower Personnel & Organization James P. Goode 4D939 - 77690	Deputy for Plans & Policy Norman G. Bittermann 4E985 – 70632	Deputy for Reserve & RDTC Affairs Theodore C. Marrs 5E989 - 77968	Director Personnel Council Maj General John B. Henry, Jr 5C875 - 71519	Chairman Air Reserve Forces Policy Committee Maj General Lewis A. Curtis ANGUS 5E989 - 54477

CHIEF
OF CHAPLAINS
Maj Gen E. R. CHESS
1D78 - T8 - 69205

SURGEON
GENERAL
Lt Gen R.L. Bohannon
2718 - T8 - 69315

ASSISTANT CHIEF OF
STAFF
INTELLIGENCE
Maj Gen J. E. Thomas
4A932 55613

ASSISTANT CHIEF OF
STAFF
RESERVE FORCES
Maj Gen Richard S. Abbey
5C912 59225

CHIEF SCIENTIST
Dr R. H. Cannon, Jr
4E320 77844

SECRETARY OF THE AIR STAFF
Col James H. Watkins
4E948 79296

DCS/PLANS & OPERATIONS
Lt Gen Glen W. Martin
Executive - Col K.L. Christensen
4E1D20 79991

ASSISTANT DEPUTY CHIEF OF STAFF
Maj Gen R. N Smith
4E1D20 79811

PLANS
en Lucius D. Clay, Jr
E1032 55833

OPERATIONS
Maj Gen W. P. Swancutt
BD913 76745

DOCTRINE, CONCEPTS
& OBJECTIVES
Brig Gen R. A. Yudkin
4D1083 54466

DCS RESEARCH & DEVELOPMENT
Lt Gen J. R. Holzapple
Executive - Col E. T. Hovatter
4E334 76957

ASSISTANT DEPUTY CHIEF OF STAFF
Maj Gen O. J. Glasser
4E334 76518

ASSISTANT FOR
R&D PROGRAMMING
Col F. J. Hoermann
4C331 76915

ASSISTANT FOR
RECONNAISSANCE
Col J.W. Dixon
5C1075 77990

ASSISTANT FOR
FOREIGN DEVELOPMENT
Col G. B. Monroe, Jr.
5D328 56625

DEVELOPMENT
Maj Gen A. J. Evans, Jr
4E314 77340

SCIENCE
& TECHNOLOGY
Brig Gen E. B. Giller
4D344 52147

OPERATIONAL
REQUIREMENTS &
DEVELOPMENT PLANS
Maj Gen K. C. Dempster
4E342 53020

DIRECTOR
OF SPACE
Maj Gen James T. Stewart
4E335 56872

DCS/SYSTEMS & LOGISTICS
Lt Gen T. P. Gerrity
Executive - Col W. L. Phillips
4E262 53153

ASSISTANT DEPUTY CHIEF OF STAFF
Maj Gen R. G. Ruegg
4E262 56236

ASSISTANT FOR
LOGISTICS PLANNING
Maj Gen T. F. O'Keefe
4B333 76922

PRODUCTION
& PROGRAMMING
Maj Gen H. E. Goldsworthy
4D257 78430

PROCUREMENT
POLICY
Col R. J. Meyer
4C261 56332

MILITARY
ASSISTANCE
Brig Gen H. V. Larson
5A334 76955

SUPPLY
& SERVICES
Brig Gen E.L. Ramme
4B283 54900

TRANSPORTATION
Brig Gen A. N. Williams
4407 - MUNB - 65971

MAINTENANCE
ENGINEERING
Maj Gen Harald E. Humfeld
4A264 55356

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

MARCH 1967

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

APRIL 1967

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

MAY 1967

SPEAKERS CALENDAR

DEPARTMENT OF DEFENSE

Mr. Edward T. Jones, Staff Dir., Contractor Performance Evaluation, Office of Asst. Secretary of Defense (Installations & Logistics), at the National Contract Management Assn. Meeting, Mountain View, Calif., April 11.

Mr. Henry A. Wallace, Los Angeles Regional Manager, Defense Contract Audit Agency, at the National Contract Management Assn. Meeting, Los Angeles, Calif., April 15; at the Federal Bar Assn. Meeting, Santa Monica, Calif., April 18.

Lt. Gen. H. C. Donnelly, USAF, Dir., Defense Atomic Support Agency, at Western States Civilian-Military Traffic Safety Conference, Albuquerque, N.M., April 18; at Kiwanis Club, Albuquerque, N.M., April 19.

Maj. Gen. J. B. Bestic, USAF, Dep. Dir. for National Military Command System Technical Support, Defense Communications Agency, at Institute of Electrical and Electronics Engineers Meeting, Jackson, Miss., April 18.

DEPARTMENT OF THE ARMY

Lt. Gen. Ben Harrell, Commanding General, U. S. Army Combat Developments Command, at Assn. of U.S. Army Meeting, St. Louis, Mo., March 21; at Assn. of U.S. Army Meeting, Worcester, Mass., March 29; at Mobility Forum, Allison Division of General Motors, Indianapolis, Ind., April 12.

DEPARTMENT OF THE NAVY

Adm. David L. McDonald, Chief of Naval Operations, at Army War College, Carlisle, Pa., April 24.

RAdm. Phillip Beshany, Dir., Submarine Warfare, Office of Chief of Naval Operations, at Kiwanis Club, Columbus, Ga., May 16.

DEPARTMENT OF THE AIR FORCE

Lt. Gen. R. L. Bohannon, Surgeon General of the Air Force, at Aerospace Medical Assn. Meeting, Washington, D.C., April 10–13.

Lt. Gen. Sam Maddux Jr., Commander, Air Training Command, at Community Council Meeting, San Antonio, Tex., April 11.

Brig. Gen. P. R. Stoney, Vice Commander, Air Force Communications Service, at Collins Radio Technological Assn. Meeting, Cedar Rapids, Iowa, April 11; at Armed Forces Communications and Electronics Assn. Meeting, Maxwell AFB, Ala., April 18.

Lt. Gen. T. P. Gerrity, Dep. Chief of Staff (Systems & Logistics), at American Ordnance Assn. Meeting, Washington, D.C., April 12; at National Society of American Value Engineers Meeting, Chicago, Ill., April 24; at American Ordnance Assn. Meeting, Washington, D.C., May 11; at Inter-Agency Data Exchange, Houston, Tex., May 17.

Maj. Gen. J. W. O'Neill, Commander, Electronic Systems Division, Air Force Systems Command, at Joint Computer Conference, Atlantic City, N.J., April 19.

Hon. R. H. Charles, Asst. Secretary of the Air Force (Installations and Logistics), at National Contract Management Assn. Meeting, Baltimore, Md., April 27; at National Contract Management Assn. Meeting, Cape Kennedy, Fla., May 2.

Brig. Gen. J. S. Bleymaier, Commander, Air Force Western Test Range, at American Society for Quality Control Meeting, Vandenberg AFB, Calif., April 27.

Maj. Gen. G. T. Gould Jr., Dir., Command, Control and Communications, Office of the Dep. Chief of Staff (Programs and Resources), Hq., U.S. Air Force, at DOD Computer Institute, Washington, D.C., May 1.

AF Missile Center Gets Three-Axis Flight Simulator

The state of the art in inertial guidance testing has taken a sizable step forward at the Air Force Missile Development Center (AFMDC), Holloman AFB, N.M., with the installation of a three-axis flight simulator.

The simulator will be used by the center's Central Inertial Guidance Test Facility to test complete guidance systems at a known controlled angular rate in a simulated flight environment prior to actual aircraft flight or to rocket sled tests on the center's high speed test track.

Bolted to the concrete floor in the AFMDC Gyroscope Test Branch area, the new facility consists principally of four major subassemblies: the three-gimbaled simulator, the hydraulic drive unit, the electronic control console, and an analog computer to program the simulator.

Angular motion of aircraft flight may be simulated in all three axes, getting data in a known, controlled environment for all second generation guidance systems. In this way, a guidance system under simulated flight conditions may be evaluated. Linear motion cannot be simulated, however. The simulator is controlled in all three axes by an analog computer which is programmed for the desired motion.

The frequency and amplitude of each axis is variable and independent of the other two axes.

Air Force Awards Six Contracts For V/STOL Transport Design

Six study contracts totalling $482,000 for design of a vertical short takeoff and landing (V/STOL) light transport aircraft have been awarded by the Aeronautical Systems Division of the Air Force Systems Command.

Contractors will research and analyze various V/STOL systems, investigate different propulsion units, and prepare the best aircraft design for each propulsion system. Contracts also call for preparation of a detailed technological development program for each aircraft configuration. Design payload of the V/STOL transports will be from four to nine tons.

Information acquired under the study contracts may be used by the Aeronautical Systems Division for future development of V/STOL aircraft.

The seven-month contracts, which began in December 1966, will develop information on a V/STOL-type light transport which can respond to planned or emergency support requirements. It will operate from semi-prepared airfields, and from unprepared forward area sites.

Contracts for the work went to Vought Aeronautics Division of LTV Corp., Lockheed-Georgia Co., McDonnell Corp., Vertol Division of Boeing Co., Sikorsky Aircraft Division of United Aircraft Corp., and Lockheed California Co.

CALENDAR OF EVENTS

April 3–6: Fourth Space Congress, Cocoa Beach, Fla.

April 3–6: New York Academy of Science/American Institute of Aeronautics and Astronautics International Congress of Subsonic Aeronautics, New York, N.Y.

April 5–7: Ocean from Space Symposium, Houston, Tex.

April 5–7: American Institute of Architects Meeting, Milwaukee, Wis.

April 5–7: Institute of Management Sciences Meeting, Boston, Mass.

April 9–14: American Chemical Society Meeting, Miami Beach, Fla.

April 10–12: American Society of Mechanical Engineers Meeting, Detroit, Mich.

April 10–12: Institute of Environmental Sciences Meeting, Washington, D.C.

April 10–13: Aerospace Medical Assn. Meeting, Washington, D.C.

April 17–19: American Institute of Aeronautics and Astronautics Thermophysics Specialist Conference, New Orleans, La.

April 18–20: Joint Computer Conference, Atlantic City, N.J.

May 1–3: American Society for Quality Control Meeting, Chicago, Ill.

May 1–5: American Society for Training and Development Meeting, Boston, Mass.

May 2–3: National Security Industrial Assn. Seventh Innerspace Conference, Washington, D.C.

May 3–5: Electronic Components Conference, Washington, D.C.

May 6–7: American Helicopter Society Meeting, Washington, D.C.

May 7–12: Electrochemical Society Meeting, Dallas, Tex.

May 8–10: Fludics Symposium, Lafayette, Ind.

May 8–12: American Society of Civil Engineers Meeting, Seattle, Wash.

May 8–13: Mechanical Contractors Assn. of America Meeting, Kansas City, Mo.

May 11: American Ordnance Assn. Meeting, Washington, D.C.

May 11: National Defense Transportation Assn. Meeting, Fort Eustis, Va.

May 15–18: Society of Plastic Engineers Meeting, Detroit, Mich.

May 16–18: 1967 National Telemetering Conference, San Francisco, Calif.

May 20: Armed Forces Day.

May 22–25: American Institute of Aeronautics and Astronautics Advanced Marine Vehicles Meeting, Norfolk, Va.

May 23–25: Armed Forces Communications-Electronics Assn. Meeting, Washington, D.C.

May 31–June 2: American Society for Quality Control Annual Convention, Chicago, Ill.

Navy Establishes Strategic Warfare Office

Secretary of the Navy Paul H. Nitze has announced the centralization of all Navy strategic warfare activities within the Office of the Chief of Naval Operations.

Called the Office of Director for Strategic Offensive and Defensive Systems (OP-97), the new office will provide overall guidance and coordination for planning, development and study of the Navy's growing strategic forces.

Rear Admiral George H. Miller has been designated director of the office. He will report to the Vice Chief of Naval Operations. Admiral Miller has been serving as Director of the Long Range Objectives Group and Chairman of the Strategic Systems Action Group in the Office of the Chief of Naval Operations.

Navy Shipbuilding Program for Fiscal Year 1967 Announced

The Navy has announced its ship-building program for FY 1967 allocating construction primarily to private shipyards. The nine naval shipyards are heavily committed, particularly in the repair and conversion of complex combatant ships. However, the San Francisco Bay Naval Shipyard will construct one decontamination barge (YFN) and one nuclear-powered attack submarine (SS(N)), and the Portsmouth, N.H., Naval Shipyard will build one decontamination barge.

Construction of the following ships in the FY 1967 Shipbuilding Program will be undertaken in private yards following competitive bidding (DE's and LST's already assigned as noted):

1 nuclear-powered attack aircraft carrier (CVA(N))
5 nuclear-powered attack submarines (SS(N))
1 nuclear-powered guided missile frigate (DLG(N))
1 dock landing ship (LSD)
11 tank landing ships (LST) (National Steel & Shipbuilding Corp., San Diego, Calif.)
10 escort ships (DE) (Avondale Shipyards, Westwego, La.)
5 ocean minesweepers (MSO)
2 ammunition ships (AE)
1 combat store ship (AFS)
2 replenishment fleet oilers (AOR)
1 submarine rescue vessel (ASR)
2 salvage tugs (ATS)
1 oceanographic research ship (AGOR)
2 surveying ships, medium (AGS)
311 miscellaneous landing and service craft

The nuclear-powered attack carrier in the program will be an improved version of the USS Enterprise (CVA(N)–65) and the most modern warship in the world. She will be powered with the new two-reactor plant that has been under development by the Atomic Energy Commission. The new carrier will have an overall length of 1,092 feet, a waterline beam of 134 feet, and a full-load displacement of about 91,300 tons. The ship's mission will be to support and operate aircraft to engage in sustained operations in support of other forces.

The nuclear-powered attack submarines in the program are the same class as those included in the FY 1966 Shipbuilding Program. These submarines are designed for maximum effectiveness against all types of ships, particular enemy submarines. They will have a high submerged speed and long-range sonar detection equipment. They will be equipped with antisubmarine warfare weapons such as antisubmarine rockets (SUBROC). They will have an overall length of about 300 feet, a maximum beam of 32 feet, and a full-load displacement of about 4,650 tons.

The guided missile frigate will be equipped with Tartar missile capability which will enable the ship to operate offensively, independently, or with strike, antisubmarine, or amphibious forces against submarine, air and surface threats. The ship will be 596 feet long, have a maximum beam of 60 feet, and a full-load displacement of 10,100 tons.

The 313 miscellaneous landing and service craft in the program include barges, lighters, and various landing craft of all sizes whose combined functions consist of landing personnel, vehicles and equipment from ship to shore.

Project ARISTOTLE

by

Eugene T. Ferraro

Dep. Under Secretary of the Air Force (Manpower)

Readers of the *Defense Industry Bulletin* during the last year are aware of the increased interest of the Defense Department in applying new education and training technologies to its education and training program. In the April issue of the *Bulletin*, the Assistant Secretary of Defense (Manpower) announced the Engineering Systems for Education and Training Conference held in June 1966 for the emerging educational technology industry. Over 500 representatives of industry attended the conference and many who did not are familiar with the proceedings of this endeavor to describe the magnitude and scope of DOD training programs as well as point out priority areas.

Following the conference, in the July issue, Roy Davenport, then Deputy Assistant Secretary of Defense for Manpower, Planning and Research, highlighted the key discussions of the conference and again emphasized DOD's strong intentions to pursue this program.

Finally, in an article published in the October issue, I described the Air Force's participation in this effort. That article mentioned a "follow-up" being planned by the National Security Industrial Association (NSIA) which co-sponsored the June conference with the Defense Department. The follow-up is known as Project ARISTOTLE (Annual Review of Information and Symposium on the Technology of Training and Learning and Education). I have been assigned DOD executive agency responsibility for Project ARISTOTLE.

The NSIA Training Advisory Committee, headed by Marvin Kahn, Vice President, Aircraft Armaments, Inc., has taken the initiative to organize creative industrialists, educators and interested parties in the direction of Project ARISTOTLE.[a] Over 200 representatives of these organizations have volunteered their services to study the potential applications of new training technology to DOD education and training programs.

What is Project ARISTOTLE?

ARISTOTLE is an appropriate acronym for this large effort to assist the Defense Department in applying a systematic approach to its education and training problems. The scientific approach to method, the predecessor of the 20th century "systems approach," can be traced back to this Greek philosopher.

Project ARISTOTLE will attempt to "provide a structure to encourage continuing communication and exchange of accomplishments within the Government/industry/education community and contribute to the advancement of quality and efficiency of the nation's education and training." NSIA has accepted the task of pulling together creative and imaginative people who have volunteered to study various problem areas and make recommendations to the Secretary of Defense, as well as to the Office of Education and other Federal agencies with whom they are working.

Several points about ARISTOTLE merit specific comment. First, it is a working project made up of voluntary representatives from universities and education associations. Second, its studies and recommendations have short- as well as long-term potentials. Third, although DOD took the initiative, other Federal agencies, such as the Office of Education, will be working closely with the task groups. Fourth, while other groups (e.g., the Committee for Economic Development, American Management Association, etc.) are concerned with various aspects of the Government/industry/education area, ARISTOTLE is the first and largest concerted effort by industrialists and educators to work with Federal agencies to study the new problems which impede the application of advanced technologies and management concepts to education and training.

The overall significance of ARISTOTLE is that it will be tackling some of the thorny and difficult problems confronting both industry and the Federal Government as we attempt to apply new teaching technology to DOD education and training.

NSIA task groups are presently studying particular priority and problem areas in which industry, as well as the education community, feels it can contribute new and forward looking recommendations for solutions to some of the old education and training problems. The task forces are listed below:

- Project 100,000.
- Media.
- Information Storage and Retrieval.
- Education Research.
- New Developments.
- Systems Analysis in Education.
- Standards, Measures and Evaluation.
- Courses, Skills and Tasks.
- Government/Industry Interface.
- International Considerations.

Project 100,000.

"Project 100,000," initiated by the Secretary of Defense last August, will have taken into the Military Services by October '1967 about 40,000 individuals who normally would have been rejected because of mental aptitude or physical reasons. During the following 12 months about 100,000 of these young men will be accepted. It is felt that new training techniques, many developed by industry, have great potential for providing these young men the opportunity to realize their capabilities and, thereby, contribute to the effectiveness of our fighting forces. Existing screening techniques, which do not consider these new training methods, may be inadequate predictors of "trainability." Industrialists who have conducted "in-house" or other training programs like the Job Corps can assist us by sharing their experiences. Many of the techniques developed and tested in these programs, as well as other novel techniques awaiting demonstration of their merit, could be used in the pilot programs of Project 100,000.

Media, Developments and Standards.

The task groups concerned with "media," "new developments," and "standards and measurements" will certainly overlap each other. Although this in itself might be healthy, the industrial interest in each of these areas appears to be so great that NSIA thought it advisable to have three individual groups. The problems in these areas are interrelated.

---

[a] *NSIA contact for additional information on Project ARISTOTLE is: Robert Walsh, Executive Secretary, Training Advisory Committee, National Security Industrial Association, 1030 15th Street NW, Washington, D. C. 20005, Telephone: (202) 296-2266.*

The problem with the use of existing media, such as educational television, closed-circuit television and films, is not that they aren't technically feasible but, rather, that they have generally been used ineffectively. The Killian Report on the use of television supports this contention. The question is really concerned with quality control over operation and curriculum development.

The "new developments" group is confronted with another question: Where can we find "laboratory-type" training operations which enhance experimentation on the effectiveness of new technology, such as computer-assisted instruction?

There is also the question of measurements. Industry, it may be presumed, is producing a new technology on the assumption that, if it is more efficient than existing techniques, the market will be created. Yet the market to which it is selling is too often not geared towards efficiency because the criteria for measuring output (i.e., how well the learner learns) do not exist in many cases. Without these criteria the present method of decision making, based often on costs of inputs (teachers, teaching machines, etc.) without regard to effectiveness, will foreclose feasible alternatives which utilize advanced and costly technology. Education is not an "industry" based on quality control criteria in which the managers consider "rejects" as costs of operations.

Systems Analysis and Instructional Systems.

The task groups studying "systems analysis" and "courses, skills, and tasks" are related but are directed at different problems. Systems analysis is a management technique for presenting alternatives to decision makers in all facets of education and training including directly related support activities such as research and development. It has to be separated from the "instructional systems approach" which is a methodology concerned with the tasks and skill requirements related to a particular course or cluster of courses. Both need to be thoroughly defined, and areas where each may be used effectively must be determined.

Education Research.

Education research is a topic in which Government agencies, especially the Office of Education (OE), are interested. Recently, the OE authority was changed by legislation so that industry could perform research within its $100-million-a-year research program. The problem today in education research appears to be more the question of quality rather than quantity. In 1963 there were about 1,500 "hard core" researchers who contributed to the solution of education problems. In 1966, this number jumped to 6,000. However, like the growth of "scientists" and "engineers" in the defense research and development buildup during the 1950's, the increase in dollars through the legislation, the Elementary and Secondary Education Act, enticed many less qualified individuals into the area. Alongside the problem of qualified researchers is the problem of qualified project managers over research undertakings. These individuals have not been spawned by universities because of the previous use by sponsoring Federal agencies of the grant rather than the contract system. There is also the problem of peer acceptance of the manager among his fellow researchers. Since the management capability appears to be strongest in industry, as industry increases its share as a performer, we will have to find some equitable way of insuring disclosure of privately financed and Federal research results which could lead to the improvement of education and training programs. Procedures to insure quality research appear to be as important as the question of qualified performers.

Government/Industry Interface.

The group of individuals studying the "Government/industry interface" problem in education is confronted with a multiplicity of problems and is faced with the necessity of establishing priorities. The emerging education industry appears to be following a pattern similar to that evolution of the defense industry in the late 1940's and early 1950's. Education research efforts are being discussed; the contract system and its management technique are beginning to be used by several Federal agencies.

Four areas which need to be studied certainly deserve priority attention. First, Federal dollars for education affect the decisions of both the producers and the consumers of industry's services and new technologies. Therefore, there is a need for direct communication between Government agencies at all levels and industry. Second, institutional mechanisms must be developed to create atmospheres conducive to "field testing" and evaluation of new technologies and the concurrent development of performance-based standards which will encourage further innovation. Third, Federal agencies and/or local school systems must develop methods to assure that industry's capabilities are used effectively. Fourth, there is the question of cost-sharing arrangements between the sponsoring agencies and the performers for educational "hardware" and "software." This question certainly raises the thorny issue of patents and copyrights.

National Benefits.

In this article an attempt has been made to point out the difficult problems which will be studied. ARISTOTLE will not be playing an "ostrich game!" Even though representation might appear to be top heavy with "defense" membership, either from DOD or defense industry, the orientation will be more general. The defense-oriented base will merely provide the foundation from which we can generalize the feasibility of applying many of the techniques and experiences of the DOD-industry partnership to our national education and training problems.

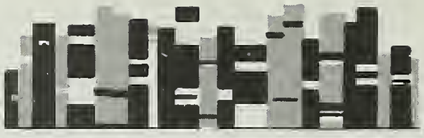
As the Defense Department, in its own training and education programs, continues and expands its use of new technologies, the effectiveness of our fighting forces will be improved. At the same time "guided" spin-off through Project ARISTOTLE will benefit the nation as a whole.

Navy Oceanographer Relocates

The Oceanographer of the Navy, Rear Admiral O. D. Waters Jr., and his staff have relocated from Suitland, Md. to Alexandria, Va.

OCEANAV NOTICE 5430 of Jan. 23, 1967, advises that, effective Feb. 15, 1967, correspondence to the Oceanographer of the Navy will be addressed as follows:

Oceanographer of the Navy
The Madison Building
732 N. Washington St.
Alexandria, Va. 22314



BIBLIOGRAPHY

The publications listed below may be obtained at the following addresses:

Defense Procurement Circulars:

Distribution is made automatically to subscribers of the Armed Services Procurement Regulation by the Government Printing Office.

Government Printing Office Publications:

U.S. Government Printing Office
Washington, D.C. 20402

Research Reports

Authorized DOD contractors and grantees may obtain these documents without charge from:

Defense Documentation Center
Cameron Station
Alexandria, Va. 22314

Others may purchase these documents at the price indicated from:

Clearinghouse for Federal and Scientific Information
Department of Commerce
Springfield, Va. 22151

DEFENSE PROCUREMENT CIRCULARS

Defense Procurement Circular No. 50, Dec. 30, 1966. (1) Contractor Weighted Average Share in Cost Risk ("CWAS"). (2) Insurance—Liability to Third Persons. (3) Contractors' Estimating Systems. (4) Exceptions to Screening of Contractor Termination Inventory. (5) Fee Policy for Contracts with Nonprofit Organizations. (6) List of 100 contractors—ASPR 1-319(e).

Defense Procurement Circular No. 51, Feb. 3, 1967. (1) Realistic Contract Delivery Schedules. (2) Small Business Concerns. (3) Shipments from the United States for Overseas Delivery. (4) Status Report on Defense Procurement Circulars.

GOVERNMENT PRINTING OFFICE PUBLICATIONS

Guide For Auditing Automatic Data Processing Systems. Provides the Air Force auditor with general information relative to automatic data processing systems and furnishes guidelines for surveying these systems and auditing their products. The material is arranged to permit its use as a textbook for self-teaching and/or classroom courses. 1966. 166 p. il. Catalog No. D 301.6/5:Au 8/966. $1.

Glossary of Oceanographic Terms, 1966. Provides definitions of technical terms used in oceanography and allied marine sciences. The terms are arranged alphabetically and followed immediately by definition or a reference to the preferred synonym. 1966. 204 p. il. Catalog No. D 203.22/3:35. $2.25.

Government Use of Satellite Communications. Hearings before a Subcommittee of the House Committee on Government Operations on satellite communications from the standpoint of Government operational programs and procurement of services from carrier sources. 1966. 850 p. il. Catalog No. Y 4.G74/7:C 73/5. $2.25.

Dictionary of U.S. Military Terms for Joint Usage. Prepared under the direction of the Joint Chiefs of Staff in coordination with the military services for planning and operational usage. Terms and definitions which have been approved for the NATO and SEATO glossaries are incorporated in this edition with those which have U.S. joint service approval. 1966. 204 p. Catalog No. D 5.12:1/6. $1.25.

Military Standardization Handbook, Office Copying Processes and Equipment. Provides fundamental guidelines for military users of office copying machines with information on each of the well known processes and on most of the copying machines now available. Intended as a guide to aid users in determining the copying process which will best satisfy their needs. 1966. 71 p. Catalog No. D 7.6/2:153. 40¢

RESEARCH REPORTS

Light Duty, Expandable Land Anchor. Naval Civil Engineering Laboratory, Port Hueneme, Calif., Oct. 1966, 59 p. Order No. AD-640 232. $3.

Evaluation of Thin-Film Resistors and Crossovers. Naval Avionics Facility, Indianapolis, Ind., Oct. 1966, 106 p. Order No. AD-640 933. $3.

Fast Millimeter Ferrite Latching Switch. Army Electronics Command, Fort Monmouth, N.J., Sept. 1966, 19 p. Order No. AD-642 143. $3.

Technology, Design and Application of Integrated Circuits. Army Electronics Command, Fort Monmouth, N.J., Aug. 1966, 71 p. Order No. AD-641 642. $3.

Study of Effect of High-Intensity Pulsed Nuclear Radiation on Electronic Parts and Materials. IBM Corp., Federal Systems Div., Oswego, N.Y., for the Army, Oct. 1966, 73 p. Order No. AD-641 673. $3.

Failure Mechanisms in Resistors. ITT Research Institute, Chicago, Ill., for the Air Force, Oct. 1966, 106 p. Order No. AD-641 858. $3.

Radiation Effects on (Monolithic) Microelectric Circuits. Hughes Aircraft Co., Fullerton, Calif., for the Army, Nov. 1966, 90 p. Order No. AD-642 301. $3.

Capacitor Characteristics of Anodized Thin-Film Hafnium. Army Electronics Command, Fort Monmouth, N.J., Sept. 1966, 36 p. Order No. AD-641 338. $3.

Reliability Screening Using Infrared Radiation. Sylvania Electric Products, Inc., Woburn, Mass., for the Air Force, Oct. 1966, 132 p. Order No. AD-642 112. $3.

Ultra Wideband Digital Delay Line. Rome Air Development Center, Griffiss AFB, N.Y., Sept. 1966, 72 p. Order No. AD-641 370. $3.

Theory and Design Data for Uniformly Dissipative, Doubly Terminated Bandpass and Lowpass Filters. Lincoln Laboratory, M.I.T., for the Air Force, Feb. 1966, 199 p. Order No. AD-642 747. $3.

Magnetic Properties of Thin Films of Nickel-Iron-Molybdenum. Naval Ordnance Laboratory, White Oak, Md., May 1966, 58 p. Order No. AD-641 180. $3.

Atmospheric Humidity Atlas—Northern Hemisphere. Air Force Cambridge Research Laboratory, Bedford, Mass., Aug. 1966, 151 p. Order No. AD-642 429. $3.

Proceedings of the 1966 Army Conference on Tropical Meteorology. Army Electronics Command, Fort Monmouth, N.J., Oct. 1966, 194 p. Order No. AD-643 071. $3.

A Study of Radar Meteorological Findings Related to Radar Weather Detection and Air Traffic Control. FAA, National Aviation Facilities Center, Atlantic City, N.J., Oct. 1966, 75 p. Order No. AD-643 258. $3.

Evaluation of the Use of Atmospheric Electricity Recordings in Fog Forecasting. Naval Research Laboratory, Washington, D.C., Oct. 1966, 22 p. Order No. AD-643 363. $3.

Water Vapor Observations at Low, Middle, and High Latitudes During 1964 and 1965. Naval Research Laboratory, Washington, D.C., Sept. 1966, 207 p. Order No. AD-641 577. $3.

Telemetry Tape Combiner System. Sichak Associates, Nutley, N.J., for the Air Force, June 1966, 207 p. Order No. AD–640 447. $3.

Low Frequency Top-Loaded Antennas. Navy Electronics Laboratory, San Diego, Calif., 55 p. Order No. AD–640 490. $3.

The Multiplate Antenna. Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass., Nov. 1966, 62 p. Order No. AD–642 430. $3.

Two-Way Antenna Pattern Simulation by Analog and Analytical Methods. Naval Ordnance Laboratory, Corona, Calif., Oct. 1966, 38 p. Order No. AD–642 614. $3.

A Proposed Universal Mounting for the Receiver Transmitter, Radio RT–( )/APX–72. Naval Research Laboratory, Washington, D.C. Nov. 1966. Order No. AD–642 064. $3.

A Flush-Mounted Composite Radome Antenna System. Harry Diamond Laboratory, Washington, D.C., Nov. 1966, 31 p. Order No. AD–641 012. $3.

Implementation of Poynting Vector Measurements. University of Pennsylvania, for the Navy, Nov. 1966, 63 p. Order No. AD–640 990. $3.

Wide Range VHF Preselector. Army Electronics Command, Fort Monmouth, N.J., 38 p. Order No. AD–640 931. $3.

Study of Adaptive Antenna Techniques for Millimeter Wave Applications. Advanced Technology Corp., Timonium, Md., for the Air Force, Nov. 1966, 142 p. Order No. AD–641 710. $3.

Transducer and Interphone System for Operation in High-Ambient Noise. CBS Laboratories, for the Army, Nov. 1966, 125 p. Order No. AD–642 419. $3.

An Indirectly Heated Gas-Turbine Cycle for Minimizing Sulfidation Corrosion. Navy Marine Engineering Lab, Annapolis, Md., Oct. 1966, 30 p. Order No. AD–641 015. $3.

Effect of Polymer Coiling on Drag Reduction. Research Div., Western Co., for the Navy, Aug. 1966, 117 p. Order No. AD–642 441. $3.

Applications and Optimizations of Structural Composites for Aircraft Wings. General Electric Space Sciences Laboratory, for the Air Force, Oct. 1966, 33 p. Order No. AD–642 092. $3.

Measurement of Cavity Shapes Above Ventilated Hydrofoils. Hydronautics, Inc., for the Navy, 44 p. Order No. AD–640 187. $3.

An Engineering and Economic Evaluation of Floating Fender Concepts. Science Engineering Associates, for the Navy, June 1966, 152 p. Order No. AD–640 979. $3.

Tidy, A Computer Code for Renumbering and Editing Fortran Source Programs. Air Force Systems Command, 101 p. Order No. AD–642 099. $3.

Interprogram Communications, Program String Structures, and Buffer Files. Rome Air Development Center, Griffiss AFB, N.Y, Oct. 1966, 27 p. Order No. AD–640 798. $3.

Transient Radiation Vulnerability of Monolithic Binary Circuits. Rome Air Development Center, Griffiss, AFB, N.Y., Sept. 1966, 148 p. Order No. AD–640 821. $3.

Deposition of Carbon on Diamond Seed Crystals. Case Institute of Technology, Cleveland, Ohio, for the Air Force, Dec. 1966, 14 p. Order No. AD–642 786. $3.

High-Modulus Glasses Based on Ceramic Oxides. Rocketdyne, Canoga Park, Calif., for the Navy, Nov. 1966, 94 p. Order No. AD–642 259. $3.

An Exploratory Study of the Feasibility of Glass and Ceramic Pressure Vessels for Naval Applications. David Taylor Model Basin, Washington, D.C., Nov. 1966, 36 p. Order No. AD–641 875. $3.

The Effects of High Uniaxial Compressive Stress on Glass. University of Vermont, for the Navy, 19 p. Order No. AD–640 847. $3.

On the Fracture Energy of Glass. University of Vermont, for the Navy, 17 p. Order No. AD–640 848. $3.

The Effect of High Pressure on B_2O_3: Crystalization, Densification and the Crystalization Anomaly. Harvard University, for the Navy, Nov. 1966, 54 p. Order No. AD–641 324. $3.

Glass. Foreign Technology Div., Wright-Patterson AFB, Ohio, Dec. 1966, 4 p. Order No. AD–643 737. $3.

Bibliography of Schlicht Functions. New York University, for the Navy, May 1966, 169 p. Order No. AD–642 657. $3.

Bibliography on Statistical Robustness and Related Topics. University of Connecticut, for DOD and NASA, Jan. 1966, 22 p. Order No. AD–631 528. $3.

Recent Trends in Multivariate Prediction Theory. Army Mathematic Research Center, Madison, Wis., Jan. 1966, 58 p. Order No. AD–630 756. $3.

An Extended Table of Zeros of Cross Products of Bessel Functions. Aerospace Research Laboratories, Wright-Patterson AFB, Ohio, Feb. 1966, 135 p. Order No. AD–637 474. $3.

A New Initial Value Method for Internal Intensities in Radiative Transfer. Rand Corp., for the Air Force, March 1966, 24 p. Order No. AD–630 121, $3.

Information Processing Potentials in Large-Scale Operations. Systems Development Corp., for the Air Force, July 1966, 42 p. Order No. AD–640 591, $3.

Social Sciences Information Systems Workshop Proceedings. Proceedings of a three-day workshop sponsored by American University and the Systems Development Corp., for the Army, May, 1966. Order No. AD–643 990. $3.

Imitation, Modeling and Cross-Cultural Training. Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio, July 1966, 40 p. Order No. AD–642 427. $3.

Computer Assisted Instruction; A Selected Bibliography and KWIC Index. Naval Weapons Laboratory, Dahlgren, Va., Aug. 1966, 48 p. Order No. AD–638 892. $3.

Psychological Studies of Advanced Naval Air Training: Evaluation of Operational Flight Trainers. Psychological Corp., New York, for the Navy, Dec. 1966, 156 p. Order No. AD–643 499. $3.

Behavior and Maximum Strength of Metal Columns. University of Michigan, for the Navy, May 1966, 68 p. Order No. AD–634 495. $3.

The Synthesis of Special Fluorine-Containing Monomers. University of Colorado, for the Army, Jan. 1966, 117 p. Order No. AD–636 217. $3.

Standardization Program on Shelf Aging of Natural and Synthetic Rubber Materials. Naval Applied Science Laboratory, Brooklyn, N.Y., Sept. 1965, 15 p. Order No. AD–470 542. $3.

Thermal Conductivity of Soft Vulcanized Natural Rubber: Selected Values. Army Natick Laboratories, Natick, Mass., June 1966, 34 p. Order No. AD–643 325. $3.

Summary Engineering Report for Development of Gallium Arsenide-Phosphide Graded Band-Gap Base Transistor Structures. Texas Instruments, Dallas, Tex., for the Navy, July 1965, 87 p. Order No. AD–467 531. $3.

Annealing of Gamma-Ray Induced Defects in Bi-Doped Germanium. Harry Diamond Laboratories, Washington, D.C., 15 p. Order No. AD–637 691. $3.

A Cryogenic Magnet System for Quasi-Continuous Operation. McGill University, Montreal, Canada, for the Navy, Nov. 1966, 11 p. Order No. AD–641 919. $3.

Improvement of Low Temperature Environmental Testing Criteria and Procedures (Part I). Frankford Arsenal, Philadelphia, Pa., Dec. 1966, 32 p. Order No. AD–642 572. $3.

The Inception of Nucleate Boiling With Liquid Nitrogen. M.I.T., for the Air Force. Order No. AD–634 256. $3.

A Standardized Method for Making Neutron Fluence Measurements by Fission Fragment Tracks in Plastics. Naval Radiological Defense Laboratory, San Francisco, Calif., for DASA., Oct. 1966, 32 p. Order No. AD–643 540. $3.

Management Systems Control

by

Col. Albert W. Buesking, USAF

These last few months have witnessed the merging of what initially were two independent efforts carried on by Government and industry, each with a common objective: to cope with the increasing proliferation of divergent, and frequently incompatible, management systems used for planning, controlling, monitoring and auditing management activities.

The deep concern of industry was explicitly outlined in the findings of a year-long study conducted by a Systems Management Analysis Group (SMAG) of the Aerospace Industries Association, which was submitted to DOD's top management on May 12, 1966. The primary theme of the SMAG report was, "We (industry) find that the greatly increasing number of management systems of all kinds emanating from different functional arms of DOD and the Services, in a variety of forms, from a variety of sources and in a variety of time phasing, often coming in through different doors of industry, have an interrelationship with a cumulative effect which is adverse to the mutual objectives of Government and Industry."

Other key points highlighted in the report were: the problem of conflicts between management systems; the need for mating appropriate systems with the nature of the acquisition; the need to tailor the degree of management to the complexity of the program involved; and the need for careful examination of each new management system before its adoption to assure its consistency with other systems, to assure its consistency with the overall body of DOD policy, and to assure that the new system is—in fact—worthwhile when considered in light of the expense involved in its application.

At about the same time that industry was preparing its report, the Office of the Secretary of Defense was voicing its concern with the same problem. In a speech delivered March 3, 1966, Robert N. Anthony, Assistant Secretary of Defense (Comptroller), remarked as follows: "During the last decade, the Military Departments have developed and produced a wide variety of weapon and support systems, and they have also designed a wide variety of management systems for dealing with these major acquisitions. Each manager has separately wrestled with the problem of devising a system for describing plans, for measuring and controlling progress against those plans, and for recording experience so that the estimating and management job could be done better the next time. The result has been a proliferation of systems, reports and acronyms."

One of the prime reasons for this proliferation was an organizational fact of life in DOD. Each functional office and each Military Department has well defined duties and responsibilities to fulfill as outlined in various statutes, regulations and directives. Naturally, all are deeply concerned with seeing to it that these responsibilities and duties are fulfilled as efficiently and effectively as possible. From our point of view as taxpayers, we would not have it any other way.

This concern by the functional offices and the Services for the proper discharge of their assigned tasks was manifested in a number of different ways. One of these manifestations was a tendency by the Government manager to require detailed management procedures, many of which duplicated existing requirements thus spawning a seemingly endless number of reports and information systems.

Col. Albert W. Buesking, USAF, is Dir. of Management Systems Control in the Office of the Asst. Secretary of Defense (Comptroller). Prior to his assignment to this position, he held a position in the Minuteman System Program Office in which he was responsible for financial management, and planning and programming tasks. He holds a Bachelor of Science degree from Butler University and the Master of Business Administration degree from the Harvard Graduate School of Business.

To say that these requirements were placed on industry deliberately to constrain contractors and to create a paperwork burden completely misses the point. The intent, pure and simple, was to provide Defense managers with the tools and data to do the job that had been assigned to them in a way that we, as taxpayers, would expect any public figure to function as a guardian of public funds.

I mentioned that one of the prime reasons for this systems proliferation was an organizational fact of life in DOD. Simply put, there was no central coordinating responsibility for management systems. That is, there wasn't any until last August when DOD Directive 7000.1 on Resource Management Systems was published.

That directive covers Resource Management Systems, both internal and external to the DOD. The part which is of particular significance to us is Section VI, Responsibilities:

> **"A. Subject to the direction, authority, and control of the Secretary of Defense, Assistant Secretary of Defense (Comptroller) has the responsibility to provide for the design and installation of resource management systems throughout the Department of Defense.**
>
> **"B. This responsibility requires that the Assistant Secretary of Defense (Comptroller):**
>
> **"1. Maintain an overview of all DOD resource management systems activity, including an inventory of all significant DOD resource management systems, that are either in use or under development.**
>
> **"2. Review and approve proposed significant changes in resource management systems or proposed new systems.**
>
> **"3. Insure compatibility and uniformity among resource management systems.**
>
> **"4. Provide policy guidance for the characteristics of and general criteria governing resource management systems.**

"5. Insure standardization of data elements and data codes.

"6. Under certain circumstances, as described below, develop new systems or improvements in existing systems."

The criteria to be used in evaluating systems for management of capital acquisitions will:

"A. Focus on the item (or component thereof) being acquired, its quality, its time schedule and its cost in terms of both plans and actuals.

"B. Include special information subsystems applicable to acquisition of selected major capital items.

"C. Be standardized and controlled, to the extent practicable, so as to minimize the data gathering and reporting workload imposed on contractors and in-house activities.

"D. Be structured so as to minimize changes required to accounting systems used by contractors."

The directive, then, has provided the clear-cut definition of responsibility required to remedy the organizational condition that was a prime contributor to the management systems problem as it exists today.

It was only natural that a problem of this magnitude, recognized by both DOD and industry, was deserving of serious and coordinated attention by all those concerned. Indeed the wheels of cooperative effort were set in motion when Deputy Secretary of Defense Cyrus Vance in mid-1966 welcomed industry's offer to assist the DOD in resolving this significant and serious problem and, as he subsequently wrote in the October issue of *Armed Forces Management*, to look ". . . for ways to gain greater uniformity of acquisitions of major weapon systems. Our objective here is to simplify and obtain the minimum necessary information required to do our job properly."

Because the issues involved pertained to a broad segment of American industrial activity, the National Aeronautics and Space Administration (NASA) and the Council of Defense and Space Industry Associations (CODSIA) were invited to participate with DOD in the development of a course of action to deal with the problem.

At a meeting between DOD, NASA and CODSIA representatives Oct. 4, 1966, in the office of Assistant Secretary of Defense Anthony, agreement between all parties was quickly reached and preliminary steps were taken to formalize the task as a combined DOD-NASA-CODSIA effort. This is a progress report highlighting the results of that initial meeting and outlining the plans and objectives for moving ahead.

There was ready agreement among the participants with regard to the work to be done. The combined effort of the group would be directed toward achieving balance, compatibility, simplicity, and an adequate measure of uniformity among the multitude of management systems and subsystems already in existence and under development. Put another way, the objective would be to eliminate redundancies and duplication and insure compatibility between existing and proposed management systems.

The conduct of this effort will be governed by a few basic precepts:

- Impose no detailed systems on contractors. Rather, DOD will determine the general criteria which an acceptable system must satisfy; any system which will satisfy these criteria can be used to generate the required information.
- Regulate data demands on contractors. The intent, pure and simple, is to reduce markedly the volume, variety and number of management-type reports.
- Make maximum use of effective contractor management systems, but insure that data are credible and timely.
- Recognize that data requirements differ at various management levels. In particular, limit the flow of data up through the organizational hierarchy to that needed for the carrying out of top management responsibilities.
- Minimize mandatory features of information systems, leaving room for and encouraging effective innovation and progress.
- Recognize the paramount interests of the first-line manager, i.e., the project manager.
- Insure that the application and implementation of management systems are carried out in accordance with prescribed policies.

Working with these guidelines and objectives in mind, representatives of DOD, NASA and CODSIA are well on the way toward developing a recommended course of action. As of this time a number of preliminary steps have been completed.

Each participating group—DOD, NASA (NASA has elected to participate as official observer) and CODSIA—has developed and received approval of a charter outlining the purpose, function, responsibilities and method of operation. Each of these charters is compatible with its respective organization's rules and regulations, i.e., by-laws of CODSIA and DOD directives. Together, the three participating organizations compose the DOD-Industry Advisory Committee for Management Systems Control which has been officially approved.

In anticipation of the first meeting of the joint committee, DOD, NASA and CODSIA representatives had developed a proposed plan or approach for the conduct of the effort including a schedule and list of expected end products. This plan was reviewed by the full committee on Dec. 21, 1966, in Washington, D.C.

As a result of that initial joint meeting, the plan that was agreed upon can be summarized as follows. First, the entire effort divides into three distinct phases:

- Phase I covers the initial planning and ends with the approval of the plan. This approval was received Jan. 13, 1967.
- Phase II involves the need-use analysis of selected management systems, the development of general principles of procedure, and the preparation of DOD directives for formalizing the procedures.
- Phase III will be the actual implementation by DOD of the principles and procedures developed in Phase II.

These three phases are expected to require less than two years to complete, with the first two phases targeted for completion in one year.

A partial list of the expected end products of the effort of the committee includes:

- **Management Objectives**—A statement outlining the purposes to be served in the development and use of management systems in the acquisition process, i.e., the basic responsibilities of the Government manager and the way the management system aids in the fulfillment of those responsibilities.

(*Continued on page 33*)

U.S. - U.K. Logistics Cooperation

by

Michael G. Macdonald
Acting Dir., U.K. Negotiations/Weapons Planning
Office of Asst. Secretary of Defense (International Security Affairs)

In order to help meet its planned investment and consumption goals as well as to erase its balance-of-payments deficit, the Labour Government of the United Kingdom (U.K.) in its 1966 Defence Review set a goal of bringing down British defense expenditures to a level of six percent of the Gross National Product, or about $5.6 billion in 1964 prices by 1969–1970. This goal meant that the British government had to find ways to reduce defense expenditures by about $1.1 billion, or 16 percent of the level of expenditures planned by the previous government. To help achieve this end, the British government closely examined a number of major on-going weapons projects and identified three aircraft development programs for which cancellation and replacement by aircraft procurement programs promised a budgetary saving of about $1.5 billion.

The government's decision to cancel the TSR-2, P-1154 and HS-681 programs and to procure substantial quantities of C-130, F-4 and F-111 aircraft from the United States marks the real beginning of major logistic cooperation between the United States and the United Kingdom.

The two aircraft arrangements—formally called Cooperative Logistics Arrangements—covering the sale of over 60 C-130 Hercules transports, over 200 F-4 Phantoms for the Royal Air Force and the Royal Navy, and 50 F-111 aircraft, committed the United Kingdom to foreign exchange expenditures in the United States of about $2 billion.

A significant aspect of the cooperative logistics arrangements negotiated between the United States and Britain is the willingness by the United States to accept that a portion of the cost of the purchase by the United Kingdom should be returned to the United Kingdom through such devices as:

- DOD competitive procurement in the United Kingdom.
- Cooperative arms arrangements with third countries.
- Cooperative co-production.

Whatever the particular means or mix of means selected, the essential point is that these arrangements underscore, in a particular way, the "two-way street" of selling and buying which the U.S. military sales program is increasingly beginning to assume.

DOD is carrying out its willingness to cooperate with the United Kingdom to help minimize the foreign exchange impact of the aircraft procurement through cooperative co-production and competitive procurement.

Cooperative Co-production.

Arrangements have been made with U.S. prime contractors under which U.K. aerospace firms can bid for components required for the production in the United States of the aircraft bought by the British. The British content in these aircraft, of course, significantly reduces the foreign exchange cost of the aircraft.

The importance of this element can be seen from the current status of the C-130 Hercules, the F-4 Phantom and F-111 cooperative production programs. In the case of the C-130 program, British avionics in an amount of about $250,000 per aircraft and other British content of about $55,000 for fuselage panels and radomes will come from British firms. This means that for a total program cost of about $200 million, nearly $21 million, or 10 percent, of the program is British. The C-130 program has tighter delivery schedules and a smaller quantity of aircraft than the F-4 and, consequently, the British content is less than for the F-4.

Aside from the approximate $95 million special development cost to convert the F-4 to the F-4K (for the Royal Navy) and F-4M (for the Royal Air Force) configurations spent in the United States, something more than $120 million for avionics in this program will be produced in the United Kingdom—notwithstanding the fact that the aircraft are being assembled in the United States. In addition, another $200 million—reflecting expenditure by the British for Rolls Royce Spey engines—brings the total of U.K. content up to about 46 percent of the program. With the British content as large as it is in this program, extensive cooperation between our two governments and between U.S. and British industrial firms is required. License arrangements for production of more than 40 separate components have been set up, and it is estimated that about $120 million in British production will result from the British purchase of F-4 aircraft.

As far as the F-111 is concerned, only about five percent of the U.K. program, or about $25 million, will be British content. It was hoped, initially that perhaps one-eighth of the content of this highly sophisticated and complex aircraft could be United Kingdom. It turned out, however, that anything much greater than five percent could not be realized without introducing uneconomic production costs. Eight major U.S. subcontractors have made affiliations with British firms for the F-111 program.

Competitive Procurement.

As a direct outcome of the sale of F-111 aircraft to the British, DOD undertook to search out and select items of defense equipment and supplies competitively obtainable from U.K. sources, and to invite bids from British firms for such selected items. The United States agreed to establish an offset target of $325 million for direct DOD competitive procurement from U.K. sources and to assist the United Kingdom to sell $400 million of British equipment to other countries. In the implementation of its agreement to procure competitively, over the next 10 years, $325 million of defense supplies and equipment, British firms will be able to compete equally with U.S. firms for those items selected since British bids will be evaluated without imposing any differential under the Buy American Act or the DOD balance of payments program.

To date, the United States has committed purchases from the United Kingdom under the F-111 offset program of about $152 million, composed as follows:

- Two ocean-going survey ships for $16.73 million.
- One harbor tug for $7.35 million.

- Rolls Royce Spey engines for the A–7 for $100 million.
- Subcontracts in the amount of $17 million and miscellaneous purchases amounting to $10 million.

In its search for items that would meet U.S. requirements and also fit with British production availability, DOD has reviewed more than 200 items offered by the British. Most of these items have not been accepted because they do not meet our specifications. A major item still under review is the British HS–125 aircraft—a competitor to fill a possible USAF mission support requirement. Many other possible items are in various stages of consideration.

It is important to keep in mind that the F–111 offset arrangement stipulates three basic conditions:

- The items procured must fully satisfy DOD requirements for performance, quality and delivery.
- They must not cost DOD any more than comparable items from U.S. sources.
- All exceptions from the Buy American and balance-of-payments restrictions are made by the Secretary of Defense on a "case-by-case" basis.

Thus, although no "across-the-board" exception is intended, every effort to afford British firms an opportunity to compete on an equal footing with U.S. firms is made. Naturally, there are difficulties in trying to insure that British firms enjoy as equal a competitive situation with our firms as possible. Among the practical difficulties confronting the British firms, for example, is the time factor involved in the transmission of bid packages and bids between the United States and England, particularly for classified bids.

The aforementioned programs involving a British buy of U.S. military equipment offer advantages to both the United States and Britain. For the United States, the sale of major items of military equipment helps not only our own balance-of-payments problem, but contributes toward the attainment of other important policy objectives such as to increase standardization and commonality of free world military systems and equipments, and to provide friendly foreign nations with an opportunity to acquire the best possible weaponry at an economic price. For the British, the advantage is essentially economic in that the TSR–2 program alone would have cost more than $2 billion or nearly the cost of the total three aircraft programs. From the military viewpoint, the cooperative logistics arrangements have permitted the British to retain, within their limit of a two-billion pound defence budget projected for 1970, many of their world-wide defense commitments. But the greatest long-run benefit to the United Kingdom probably will stem from the new climate of logistics cooperation which permits British industry an opportunity to compete effectively with our industry for selected defense contracts and to establish reputations for quality and performance.

Army Evaluates New High Speed Teleprinters

Two new types of teleprinters which can produce messages received over radio or wire circuits at speeds up to 2,400 words a minute, 24 times faster than equipment now used, are being evaluated by the Army Electronics Command, Fort Monmouth, N.J.

The machines were developed under separate contracts by the National Cash Register Co. of Dayton, Ohio, and the Radio Corporation of America, Princeton, N.J.

The NCR version employs a thermal process while the RCA printer operates by a pressure method.

The thermal or heat printer, having no moving parts except those which adjust the paper, can be dial set for speeds of 600, 1,200, or 2,400 words a minute. At the highest of the settings, the printer produces three 80-character lines a second—one character at a time. By adding multiple electronic circuits, it can operate at 32,000 words a minute by printing all 80 characters in a line simultaneously for use with high-speed computer systems.

During the thermal process, a heat sensitive master paper is held against the stationary print heads. The sensitized image on the master paper is transferred to plain paper to produce the original text. Six or more high-quality copies can be made.

The pressure-type printer, which also employs a non-impact technique, forms characters through the use of seven horizontal printing bars and a small rolling pin.

When the rolling pin passes under the bars, they apply pressure against carbon paper which impresses the characters on standard paper. The machine prints 600 to 1,200 words a minute and produces six copies simultaneously.

USAF Scientists Develop New High Temperature Ceramic Coating

A new ceramic material promising excellent thermal protection for the outer surfaces of aircraft and space vehicles has been developed by scientists at the Air Force Materials Laboratory, Wright-Patterson AFB, Ohio.

Project engineers at the laboratory, a part of the Air Force Systems Command's Research and Technology Division, describe the white, translucent material called "Zircolite" as the best ceramic of its type ever developed for high temperature applications.

The polycrystalline, refractory zirconium oxide ceramic withstands 4,500 degrees Fahrenheit and has been tested continuously for 260 hours at 4,000 degrees Fahrenheit in the laboratory without measurable deterioration or atmospheric erosion. No other refractory oxide remains as stable and unreactive under such severe thermal conditions.

Zircolite also has very high density, strength and corrosion resistance characteristics that could make it useful to the Air Force as a coating for nose cones, rocket nozzles and other high temperature surfaces on missiles and spacecraft.

The new ceramic is made from a fine-particle, high-purity zirconium oxide powder, pressed at room temperature, then fired for short periods at 2,600 degrees Fahrenheit in a tube furnace having an oxidizing atmosphere. The ultra-high purity of the finished material gives it superior translucent properties. Ground to one-eighth inch or less, it is glass-like and transmits enough light to make legible printed material placed beneath it. This property gives it a potential application in high temperature elements for electric lamps. It could also be used for infrared and other electromagnetic radiation windows.

A unique method of chemically decomposing metal-organic compounds of zirconium produces the powder base for Zircolite. The reaction occurs in a complex glass decomposition chamber designed for the process by scientists. They also synthesized, for the first time, transition and rare-earth metal compounds used to make the new ceramic.

USAF Sole Manager of Liquid Propellants

The U.S. Air Force has been designated sole manager of liquid propellants for both the Air Force and the National Aeronautics and Space Administration.

Responsibility for the management of the $75 million annual space fuel operation has been assigned to Air Force Logistics Commands' San Antonio Air Materiel Area, (SAAMA) Kelly AFB, Tex.

DNL/DLP—
A Focal Point for Laboratory Management

by
D. C. Hughes

The Secretary of Defense has often stated as a matter of policy the need for competent and creative in-house technical laboratories within the Defense Department. Among the evident reasons underlying this need are:

- The maintenance of a national competence during peacetime, as well as during periods of conflict, in those areas of technology peculiar to the needs of national defense.
- The necessity for maintaining a continuity of effort directed toward the conception and evolution of advanced weapon systems.

The Navy laboratories represent the primary technical strength of the Navy and must play an ever increasing role in the assessment of threats and in the development of systems to meet them. In addition, the Navy requires a competent in-house capability which can monitor and assess the accomplishments of contractors, and a fast reaction capability to solve critical, immediate problems of the operating forces.

As a consequence of recognition of the requirement for a focus of special management attention for the total Navy Research Development, Test and Evaluation (RDT&E) field complex, the Office of Navy Laboratories (DNL) was created at the Departmental level with Dr. Gerald W. Johnson as director. DNL functions as one of the principal advisors to the Assistant Secretary of the Navy (Research and Development) coequal with the Deputy Chief of Naval Operations (Development), the Marine Corps Deputy Chief of Staff (Research & Development), the Chief of Naval Development, and the Chief of Naval Research.

The official charter of the Director of Navy Laboratories charges him, within the Navy-wide RDT&E field complex, with responsibility for:

- Control of the in-house exploratory development technical program and the application of programmed funds.
- Assuring optimum responsiveness of the Navy RDT&E field activities to the program-sponsoring bureaus, offices and project managers.
- Guiding the in-house laboratory independent research (Foundational Research) and Independent Exploratory Development (FR/IED) programs and controlling the application of programmed funds.
- Controlling the management and support program and the application of programmed funds.
- Establishing the Navy RDT&E Military Construction program.
- Determining the distribution of civilian personnel.
- Advising the Asistant Secretary of the Navy (Research and Development) in the selection of key personnel.
- Directing and coordinating long-range planning of RDT&E resources.
- Establishing laboratory requirements and policies.
- Representing the Assistant Secretary of the Navy (Research and Development) on laboratory policy matters.
- Acting as Chairman of the Advisory Group to the Assistant Secretary of the Navy (Research and Development) on laboratory matters.

In addition, the DNL acts as the Director of Laboratory Programs (DLP) in Naval Material Command headquarters. He is the special advisor to the Chief of Naval Material (CNM) on matters concerning management of the RDT&E field activities complex within the Naval Material Command (NMC) and, in this capacity, exercises executive authority as DLP working for CNM. The DLP office is located in the staff of the Deputy Chief of Naval Material (Development)—DCNM(D), and derives much of its support from the Laboratories/Development Resources Division under DCNM(D).

Mr. D. C. Hughes is Head of the Organization and Manpower Branch, Laboratories/Development Resources Div., under the Dep. Chief of Naval Material (Development). He has also held positions in the Laboratory Management Div., Noise Reduction Branch and the Mine Countermeasures Branch of the Bureau of Ships.

The DNL maintains a close working relationship with the Chief of Naval Research and Chief of Naval Development to ensure that the FR/IED programs are properly considered in the review and appraisal of the research and exploratory development programs. Further, he works with and is supported by the Chief of Naval Development and the laboratory management offices of the bureaus and offices of the Navy Department in the fulfillment of his responsibilities. He informs the Chief of Naval Operations and the Commandant of the Marine Corps of those matters of laboratory management policies which may affect the capabilities of the RDT&E field complex in support of the operating forces.

To date, many of the actions taken by the DNL have had attention directed to the 15 laboratories which have been placed under the direct command of the Chief of Naval Material and which are supported by the Naval Material Command's systems commands. These RDT&E field activities have been selected because of their major involvement in new weapon systems devlopment and in the support of weapon systems already operational within the fleet. The success of these systems is paramount to the effectiveness of the operating forces and the maintenance of the overall Navy defense posture. To fulfill their obligation to the fleet and further enhance their value in the systems area, the laboratories must not only be the producers of sciences and technology but they must also be thoroughly alert to the present and future operational requirements of the fleet. The laboratories' job is to provide the most effective weaponry that men can operate in all the confusion and uncertainties that characterize the combat environment. To satisfy this requirement, it is mandatory that the laboratories also understand, draw on, and stimulate the basic technical strength of the nation wherever it may exist. Further, the laboratories must understand the operational problems of the fleet as it is affected by the capabilities and limitations of its men and its organization.

The present Navy RDT&E field activity complex has evolved over the past 60 years as the needs for increased capability in new technology and sciences have become evident. At the present time, this family has grown to include over 40 separate activities. These activities are under the command of various organizational entities within the Navy, i.e., Naval Material Command, Office of Naval Research, Bureau of Medicine and Surgery and the Bureau of Naval Personnel. Until the establishment of the office of the Director of Navy Laboratories, the individual offices and bureaus, as well as their RDT&E field activities, were in direct competition for the essentials to maintain the overall RDT&E capabilities within their jurisdiction. The most important of these essentials were, and still are, manpower, facilities and program support. The operating climate within the RDT&E community is now even more acute than in the past due to the ever increasing requirement for research investigation and new weapon development, basically within a relatively fixed resource capability. Under such constraints, a focal point for resources decision making is essential to afford an optimum utilization of the fixed resources in meeting the needs of the ultimate consumer.

In this context, the DNL and his staff provide such a focal point for a critical analysis of RDT&E resources distribution measured against Navy needs. The DNL will be able to assess total Navy needs for manpower, facilities and program support in consonance with the missions of the RDT&E field activities. Within the Naval Material Command, acting in the capacity of Director of Laboratory Programs, Dr. Johnson will be responsible for the management of the laboratories commanded by the Chief of Naval Material. In addition, he will coordinate the total research resources requirements for the Naval Material Command RDT&E field activities complex in the execution of the approved Navy RDT&E conducted within the complex. These coordinated requirements will provide the base of the Naval Material Command submittal to higher authority. This submittal, along with the similar research resource requirements developed by the Chief of Naval Research, the Chief of Bureau of Medicine and Surgery and the Chief of the Bureau of Naval Personnel, will provide the total research resource requirements of the Navy for total Navy-wide coordination and decision at the DNL level.

In the few months that the DNL has been in operation, a consolidated Navy input for RDT&E facility requirements has been developed for submittal through proper channels to the Military Construction Review Board (MCRB). These requirements are being consolidated with the Navy non-RDT&E facility requirements as a total Navy requirement for facility acquisition. The DNL will provide a single voice, strongly supported by the Assistant Secretary of the Navy (Research and Development), for further support of the research complex facility requirements as they move forward through the Director of Defense Research and Engineering and other reviewing elements within the DOD and above.

In the area of Navy personnel ceilings for the RDT&E field activity complex, the problem of providing a single voice at the DNL level for total Navy requirements needs much detailed planning and interface resolution between the many organizational elements involved. The many responsibilities for budget planning and justification cannot be redirected in a short time scale, since any disruption in these planning processes would create a chaotic condition within the RDT&E community. As the DNL concept becomes more thoroughly understood within the organization of the Navy, the interfaces will be resolved and the research community and the DNL staff will develop in stature to provide a coordinated input for Dr. Johnson. In the interim, the first steps in the ultimate process are being taken by means of DLP coordination of personnel ceiling and high grade job positions within the Naval Material Command field RDT&E complex. The reorganizations within the Navy, which involved the entire Naval Material Support Establishment (now Naval Material Command), the Office of Industrial Relations (now Office of Civilian Manpower Management), and the establishment of the position of Deputy Under Secretary of the Navy (Manpower), have created many new interface areas which must be resolved as former functions and responsibilities are now found in new offices. As in all reorganizations, a great many growing pains ensue as the new operational concepts begin to take hold. The DNL responsibilities for civilian personnel distribution become a part of this concept and will be developed to maturity, and in balance with the other elements involved.

The DNL, in order to increase the effectiveness of laboratory participation in planning of programs for the future, has formed a number of interlaboratory working groups, each chaired by a member from one of the laboratories. These groups are directed to specific warfare areas of immediate concern and are intended to be standing groups separately funded to carry out their assigned function. Each group in its area of concern will have access to all necessary intelligence, and will work cooperatively with appropriate operational and analysis groups within the fleet and at headquarters. The broad charter of each group will permit them to critically assess existing warfare systems, equipment and techniques in their respective areas of interest; to relate the existing capabilities to those of potential enemies; to suggest improvement in present systems or new systems; and to define appropriate supporting research and development. The results of these efforts are directed toward providing rationale and direction for laboratory programs.

In conclusion, a gross simplification of the mission of the DNL can be stated as follows: "To insure the optimum development and utilization of the Navy's RDT&E resources in support of the approved programs." This simple statement has the deepest of implications in the execution of the following goals of the DNL function:

- A thorough knowledge of the existing field RDT&E complex and its capabilities.
- A comprehensive plan for the Navy RDT&E field complex of the future (10–20 years) based on long-range planning documents and estimates of technological requirements.
- A progressively phased program for the orderly transition.

The DNL and his supporting staff are taking positive action to achieve these goals within a reasonable time frame and are enlisting the best available talent within the Navy to formulate the program plans which point to the future Navy research resource requirements. Upon the realization of these objectives and their periodic updating, a realistic implementation plan can be developed for the orderly transition, conditioned by the internal, external, political, economic and other controlling factors, which always impinge on the plans of Government organizations.

Navy Scientists Discover Sea Desert Off Catalina

A desert under the sea has been reported by Dr. Eugene C. LaFond of the U.S. Navy Electronics Laboratory (NEL) after two dives in the San Pedro Basin near Catalina Island, Calif., in Deepstar, a deep diving research vehicle.

The desert was discovered Dec. 4, 1966, when Dr. LaFond, head of NEL's Marine Environment Division, and Dale Good, Instrumentation Engineer, went to a depth of 3,000 feet in the three-man craft. Pilot of the craft was Bob Bradley, an employee of the Westinghouse Corp., designers of the craft.

Usually brittle stars or sable fish are seen on the bottom but the basin area was completely devoid of life according to Dr. LaFond. The only organisms seen in the desert were dead squid and flat fish.

Dr. LaFond said the basin bottom was covered with a carpet of organic material about a centimeter thick. There were no worm holes or evidence of any life.

Water samples taken during the exploration of the basin indicate there is ample oxygen to support marine life. Further analyses of water samples will be made to determine phosphate, nitrate and silicate properties.

Deepstar thoroughly traversed the basin three times. Seven hours were spent underwater during the mission.

Clearinghouse Adopts New Document Sales System

A new single price/coupon system for the sale of U.S. Government-sponsored research and development reports has been adopted by the Department of Commerce Clearinghouse for Federal Scientific and Technical Information.

The document coupon is a tabulating card with a face value of the purchasing price of a Clearinghouse document. The coupon serves as the method of payment, order form and shipping label. Coupons for paper copies of documents sell at $3 each or a book of 10 coupons for $30. Coupons for microfiche copies will be sold in books of 50 coupons for $32.50. The coupons went on sale Feb. 15.

Efficiency in ordering and processing resulting from the new system have made it possible to reduce the price of documents. The new price applies to previously announced as well as new documents.

The new Clearinghouse pricing policy is a change from a sliding price scale based on document size to a single price for documents sold. The new document price for a paper copy (hard copy) is $3. Microfiche copies are priced at 65 cents for each document.

Certain reports, such as those available from the Superintendent of Documents, are priced as individually announced by the Clearinghouse rather than at the new single price. The single price does not apply to multiple copy orders of a single document. Quotations on quantity purchases of a single title are available on request.

New Electronic Control Center To Be Installed on Kwajalein Atoll

An electronic control center that will be the basis for a new anti-missile radar program has been completed and will be shipped to the Kwajalein Atoll for installation on Roi Namur Island.

The equipment is part of Project ALTAIR, a Long Range Tracking and Instrumentation Radar program sponsored by the Advanced Research Projects Agency (ARPA).

Consisting of a computer complex and several display consoles, the control center will enable operators to maneuver and monitor the 150-foot-diameter radar antenna and to display tracking information such as range, altitude, speed and trajectory of targets.

Sylvania Electric Systems is developing the ALTAIR radar system under contract to the U.S. Army Missile Command, Redstone Arsenal, Ala. The Missile Command manages the program for ARPA, an agency of the Defense Department.

Security Briefings a Must for Paris Air Show

Contractors who are planning to participate in the Paris Air Show, May 28 to June 4, 1967, are reminded of the provisions of paragraphs 5t and 6a(13) of the Industrial Security Manual for Safeguarding Classified Information (Attachment to DD Form 441). Under the provisions of this manual, contractors must insure that their employees, who will participate in the show and the attendant technical meetings, are given a briefing on the potential security hazards involved. Such briefings should be based on Appendix VII of the manual.

Prior to the foreign travel and upon completion of the travel, contractors must submit to their cognizant security office the reports required under paragraph 6a(13) of the manual.

Inspection System's Handbook Available

The Defense Department has published a new handbook, titled "Evaluation of a Contractor's Inspection System (H–51)," to provide guidance for the evaluation of contractors' inspection systems established in accordance with Military Specification MIL–I–45208A, "Inspection System Requirements."

The booklet is now being distributed throughout Government and industry and is also available for purchase from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20401, for 25 cents a copy.

Army Forms Agency To Direct Computer Processing

The Office of the Army Deputy Chief of Staff for Personnel has established an agency to centralize the direction and coordination of its automatic data processing system.

The new agency, called the Personnel Systems Directorate, will also be responsible for reports control and the clearance of selected personnel statistics, since these functions are closely associated with automated personnel systems products.

Brigadier General Lawrence H. Walker Jr., USA, formerly assigned as the Commanding General of the U.S. Army Data Support Command, has been designated as the Director of Personnel Systems.

The Personnel Systems Directorate, assisted by the Data Support Command and other agencies, will determine major areas for the application of automated systems, establish overall objectives, and assign priorities for the development of new personnel systems to support recognized needs.

MEETINGS AND SYMPOSIA

APRIL

Scientific and Technical Symposium and Contractors Counseling Service, April 4–6, Cleveland, Ohio. Sponsors: U.S. Navy, National Security Industrial Assn. and the City of Cleveland. Contact: Mr. Paul A. Newman, National Security Industrial Assn., Dept. N., Suite 800, 1030 15th St., N.W., Washington, D.C. 20005. (Area Code 202), 296–2266.

Biomechanic Symposium, April 5–6 at Augustana College, Rock Island, Ill. Sponsors: Army Research Office, Durham, N.C.; Army Weapons Command, Rock Island, Ill.; and Augustana College, Rock Island, Ill.

Conference on **Polymer Structure and Mechanical Properties**, April 19–21, at the U.S. Army Natick Laboratories, Natick, Mass. Sponsors: Army Natick Laboratories, Chief of Naval Research, Air Force Materials Laboratory, National Aeronautics and Space Administration, and the National Academy of Sciences. Contact: Malcolm C. Henry, Acting Associate Director, C&OM Div., Army Natick Laboratories, Natick, Mass. 01760, (Area Code 617) 653–1000, Ext. 430 or 642.

Annual **Frequency Control** Symposium, April 24–26, at the Shelburne Hotel, Atlantic City, N.J. Sponsor: U.S. Army Electronics Command. Contact: M. F. Timm (AMSEL-KL-SR), Electronic Components Laboratory, U.S. Army Electronics Command, Fort Monmouth, N.J. 07703, (Area Code 201) 535–2826 or 535–1728.

Physics of Superconducting Devices Symposium, April 28–29, at the University of Virginia, Charlottesville, Va. Sponsor: Office of Naval Research. Contact: Dr. Bascom S. Deaver, Chairman, Organizing Committee, Department of Physics, University of Virginia, Charlottesville, Va. 22904, (Area Code 703) 295–2166, Ext. 3128.

Annual Symposium in **Applied Mathematics "Conference on Transport Theory,"** dates undetermined, New York, N.Y. Co-sponsors: U. S. Army Research Office, Durham, N.C., and Air Force Office of Scientific Research. Contacts: Dr. Francis G. Dressel, Mathematics Div., Army Research Office-Durham, Box CM, Duke Station, Durham, N.C. 27706, (Area Code 919) 286–2285, ext. 50; or Maj. John Jones Jr., (SRMA), Air Force Office of Scientific Research, 1400 Wilson Blvd., Arlington Va. 22209, (Area Code 202) OXford 4–5261.

MAY

Annual National Colloquium on **Information Retrieval**, May 3–4, at the Hotel Adelphia, Philadelphia, Pa. Contact: STINFO Project Director, A 2100, Frankford Arsenal, Philadelphia, Pa. 19137, (Area Code 215) JE 5–2900, Ext. 3219.

Sixth **Rare Earth** Conference, May 3–5, Gatlinburg, Tenn. Co-sponsors: Air Force Office of Scientific Research and Oak Ridge National Laboratory. Contact: Dr. Anthony J. Matuszko (SRC), Air Force Office of Scientific Research, 1400 Wilson Blvd., Arlington, Va. 22209, (Area Code 202) OXford 4–5337. Program details contact: Dr. W. C. Koehler, Solid State Div., Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tenn. 37831.

Conference on **Expandable and Modular Structures for Aerospace Applications**, May 15–17, at the Carillon Hotel, Miami Beach, Fla. Sponsors: Air Force Aero Propulsion Laboratory, Space General Corp. and GCA Viron Div. Contact: Fred W. Forbes (APFT), Air Force Aero Propulsion Laboratory, Wright-Patterson AFB, Ohio 45433, (Area Code 513) 253–7111, Ext. 52771.

Interagency Data Exchange Program (IDEP) Annual Conference, May 16–18, Clear Lake, Tex. Sponsor: Policy Board, IDEP. Contact: Army Representative, Policy Board, IDEP, Systems Research & Development Branch, S&TI Division, Army Research Office, Office of Chief of Research & Development, Washington, D.C. 20310, (Area Code 202) OXford 4–3513.

JUNE

Twelfth **Science Seminar**, June 7–14, at the Western Skies Motor Hotel, Albuquerque, N.M. Sponsor: Air Force Office of Scientific Research. Contact: David L. Arm, Director, AFOSR Science Seminar, 1400 Wilson Blvd., Arlington, Va. 22209, (Area Code 202) 694–4875.

Conference on **High Energy Therapy Dosimetry**, June 15–17, in New York, N.Y. Sponsor: Office of Naval Research. Contact: Eunice Thomas Miner, Executive Director, The New York Academy of Sciences, 2 East 63rd St., New York, N.Y. 10021.

Fundamental Physics of the Magnetosphere, date undetermined, at Boston, Mass. Co-sponsors: Air Force Cambridge Research Laboratories and Boston College. Contact: Dr. J. F. McClay (CRFG), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass. 01731, (Area Code 617) 274–6100, Ext. 3218.

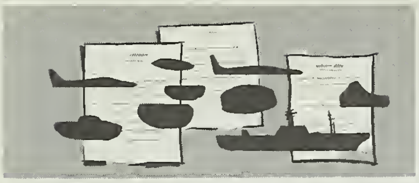
Management System Controls

(Continued from page 27)

- **Development Control Directive**—A document which will prescribe formal procedures and approval channels for the development of new or revisions to existing management systems. This will not restrict the development of those systems beneficial to the Government but will provide for an orderly development of new or revised systems to insure their need, compatibility and nonduplication with existing systems.
- **Application Control Directive**—A document which will prescribe formal procedures for the application of management systems on contracts. The purpose of this document will be to insure that the management systems selected are the appropriate ones given the nature of the acquisition, and that the purpose and intent of the system is carried through in the implementation stage.
- **Authorized System List**—A list of approved management systems for use in the acquisition process. This will be developed from an inventory of existing management systems prepared by the Management Systems Control Directorate in the Office of Assistant Secretary of Defense (Comptroller).
- **Glossary**—A dictionary of common terms used in management systems by Government and industry.

Supporting these end products is a detailed network identifying some 80 separate tasks that must be completed before these end products are achieved. These tasks will be staffed by people from each of the three participating groups and will require the better part of a full year's effort for completion. As of this writing, the first four task groups have already begun to work on their assigned tasks.

It is our intention to provide further progress reports on the conduct of this effort to encourage the support and suggestions of all interested parties.



DEFENSE PROCUREMENT

Contracts of $1,000,000 and over awarded during the month of February 1967:

DEFENSE SUPPLY AGENCY

1—The Defense Personnel Support Center, Philadelphia, Pa., has awarded the following contracts for men's wind-resistant cotton poplin trousers:

Sidran Sportswear, Dallas, Tex. $2,889,600. 700,000 pairs.

J. M. Wood Mfg. Co., Waco, Tex. $1,632,000. 400,000 pairs.

Apparel Corp. of America, Knoxsville, Tenn. $1,631,600. 440,000 pairs.

Glenn Mfg. Co., Amory, Miss. $1,570,500. 450,000 pairs.

Covington Industries, Opp, Ala. $1,047,000. 300,000 pairs.

—**A. M. Ellis Hosiery Co.,** Philadelphia, Pa. $1,182,191. 1,451,320 pairs of men's cotton, wool and nylon socks. Defense Personnel Support Center, Philadelphia, Pa.

2—**California Steel & Tube,** Los Angeles, Calif. $2,773,950. 97,500 steel bunk beds. Defense General Supply Center, Richmond, Va.

—**U.S. Bedding Co.,** St. Paul, Minn. $2,396-095. 96,500 steel bunk beds. Defense General Supply Center, Richmond, Va.

—**Koehring Co.,** Milwaukee, Wis. $1,266,300. 30 crawler-mounted shovel cranes of ¾ cubic yard capacity. Defense Construction Supply Center, Columbus, Ohio.

3—**J. P. Stevens & Co.,** New York, N.Y. $1,294,170. 537,000 yards of wool tropical cloth. Defense Personnel Support Center, Philadelphia, Pa.

—**Burlington Industries,** New York, N.Y. $1,547,150. 485,000 yards of wool serge cloth. Defense Personnel Support Center, Philadelphia, Pa.

6—**U & W Mfg. Co.,** Selma, Ala. $2,475,685. 1,054,910 pairs of men's cotton trousers. Defense Personnel Support Center, Philadelphia, Pa.

—**Winthrop Laboratories,** New York, N.Y. $3,624,768. Various quantities of primaquine and chloroquine. Defense Personnel Support Center. Philadelphia, Pa.

—**Knapp Monarch Co.,** St. Louis, Mo. $1,931,116. 73,000 insulated food containers. Defense General Supply Center, Richmond, Va.

—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for JP–r jet fuel.

Gulf Oil Corp., New York City, N.Y. $1,806,000. 16,800,000 gallons.

Phillips Petroleum Co., Bartlesville, Okla. $1,611,345. 15,130,000 gallons.

Coastal States Petrochemical Co., Houston, Tex. $1,580,250. 14,700,000 gallons.

Sinclair Refining Co., New York, N.Y. $1,147,111. 10,771,000 gallons.

Signal Oil & Gas Co., Houston, Tex. $1,015,875. 9,450,000 gallons.

—The Defense General Supply Center, Richmond, Va., has awarded the following contracts for sandbags:

Cavalier Bag Co., Lumberton, N.C. $4,243,993. 17,660,000 osnaburg bags.

Consolibag, Inc., Philadelphia, Pa. $3,863,175. 800,000 burlap and 15,250,000 osnaburg bags.

Bemis Co., Minneapolis, Minn. $3,741,020. 650,000 burlap and 15,520,000 osnaburg bags.

Continental Bag Co., Crowley, La. $1,853,025. 7,200,000 osnaburg bags.

Chase Bag Co., New York City, N.Y. $1,420,762. 5,128,000 osnaburg and 700,000 burlap bags.

Augusta Bag & Burlap Co., Augusta, Ga. $1,408,100. 4,200,000 osnaburg bags.

7—**Douglas Chemical Co.,** New York, N.Y. $1,162,720. 41,600 drums of frerric chloride. Defense General Supply Center, Richmond. Va.

8—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for 115/145 aviation gas:

Mobil Oil Corp., New York, N.Y. $10,833,451. 69,180,000 gallons.

Humble Oil & Refining Co., Houston, Tex. $10,076,067. 69,737,600 gallons.

Phillips Petroleum Co., Bartlesville, Okla. $9,718,803. 64,415,000 gallons.

Cities Service Oil Co., New York, N.Y. $8,296,120. 58,800,000 gallons.

Atlantic Richfield Co., Los Angeles, Calif. $7,717,063. 46,200,000 gallons.

Tidewater Oil Co., New York, N.Y. $3,843,804. 26,000,000 gallons.

Sinclair Refining Co., New York, N.Y. $3,627,540. 26,550,000 gallons.

American Oil Co., Chicago, Ill. $2,832,644. 19,911,000 gallons.

Continental Oil Co., Houston, Tex. $1,905,679. 12,681,900 gallons.

Texas City Refining Co., Texas City, Tex. $1,270,500. 8,400,000 gallons.

Shamrock Oil & Gas Corp., Amarillo, Tex. $1,089,540. 7,890,000 gallons.

10—**Delta Petroleum Co.,** New Orleans, La. $4,560,313. 11,397,820 gallons of lubricating oil. Defense Fuel Supply Center, Alexandria, Va.

13—**Burlington Industries,** New York, N.Y. $4,133,160. 5,400,000 linear yards of wind resistant cotton combed cloth. Defense Personnel Support Center, Philadelphia, Pa.

14—**Plant Industries, Inc.,** Plant City, Fla. $1,106,437. 54,288 cases of canned instant orange juice. Defense Personnel Support Center, Philadelphia, Pa.

—**Koehring Co.,** Milwaukee, Wis. $1,350,720. 32 crawler-mounted crane shovels. Defense Construction Supply Center, Columbus, Ohio.

16—**U.S. Steel,** Washington, D.C. $1,376,487. 278,800 feet of shipboard electric cable. Defense Industrial Supply Center, Philadelphia, Pa.

—**Marcie Dale Inc.,** Atlantic City, N.J. $1,188,900. 45,000 men's green wool serge coats with belts. Defense Personnel Support Center, Philadelphia, Pa.

17—**Pettibone Mulliken Corp.,** Washington, D.C. $2,052,896. 303 electric fork lift trucks. Defense General Supply Center, Richmond, Va.

21—**General Cable Corp.,** New York, N.Y. $1,148,642. 21,800 reels of telephone cable. Defense Industrial Supply Center, Philadelphia, Pa.

23—**Glenberry Mfg., Inc.,** Commerce, Okla. $1,042,301. 931,320 pairs of men's cotton sateen trousers. Defense Personnel Support Center, Philadelphia, Pa.

—The Defense General Supply Center, Richmond, Va., has awarded the following contracts for osnaburg sandbags:

Consolibag, Inc., Philadelphia, Pa. $1,912,500. 7,500,000 bags.

Dowling Bag Co., Valdosta, Ga. $6,274,000. 26,000,000 bags.

Continental Bag Co., Crowley, La. $1,343,310. 5,300,000 bags.

Cavalier Bag Co., Lumberton, N.C. $1,859,400. 7,600,000 bags.

Augusta Burlap Bag Co., Augusta, Ga. $1,477,000. 6,000,000 bags.

24—**Rolane Sportswear,** New York, N.Y. $1,347,430. 160,000 men's nylon-cotton sateen field coats. Defense Personnel Support Center, Philadelphia, Pa.

—**Alpha Industries,** Knoxville, Tenn. $1,339,800. 165,000 men's nylon-cotton field coats. Defense Personnel Support Center, Philadelphia, Pa.

—**La Crosse Garment Mfg. Co.,** La Crosse, Wis. $3,899,300. 200,000 mountain-type sleeping bags. Defense Personnel Support Center, Philadelphia, Pa.

27—**Standard Oil Co. of Calif.,** San Francisco, Calif. $2,535,054. 700,000 gallons of combat, Type II, automotive gasoline, and 18,252,000 gallons of grade DF–A Arctic diesel fuel. Defense Fuel Supply Center, Alexandria, Va.

—**General Fire Extinguisher Corp.,** Norhbrook, Ill. $2,449,603. 155,200 fire extinguishers. Defense Construction Supply Center, Columbus, Ohio.

—**Land-O-Lakes Creameries,** Minneapolis, Minn. $1,165,757. 3,650,400 pounds of nonfat dry milk. Defense Personnel Support Center, Philadelphia, Pa.

28—**Crowley Industrial Bag Co.,** Crowley, La. $3,687,750. 15,000,000 osnaburg sandbags. Defense General Supply Center, Richmond, Va.

ARMY

1—**Ford Motors,** Highland Park, Mich. $4,151,515. ¼-ton trucks, including engine installation, Highland Park, General Purpose Vehicle Project Manager, Warren, Mich.

—**Motorola, Inc.,** Scottsdale, Ariz. $1,500,000. Improved airborne radar surveillance sets. Scottsdale. Army Electronics Command, Fort Monmouth, N.J.

—**Superior Scaffold Co.,** Torrance, Calif. $1,799,490. Steel water tank support towers. Torrance. Army Mobility Equipment Command, St. Louis, Mo.

—**International Telephone & Telegraph Corp.,** Easton, Pa. $2,000,000. Image intensifier assemblies in connection with the Night Vision program. Roanoke, Va. Army Electronics Command, Fort Monmouth, N.J.

—**Lockheed Aircraft,** Sunnyvale, Calif. $1,665,105. Equipment and services in connection with underground nuclear testing at the Nevada Test Site. Sunnyvale, Calif., Seattle, Wash., and Nevada Test Site. Defense Atomic Support Agency, Washington, D.C.

2—**Stevens Mfg. Co.,** Ebensburg, Pa. $1,998,004. 7½-ton refrigerator vans. Ebensburg. Army Tank Automotive Center, Warren, Mich.

—**LTV Aerospace Corp.,** Warren Mich. $1,200,000. Production equipment in support of the Lance Missile Program. Sterling Township, Macomb County, Mich. Army Tank Automotive Center, Warren, Mich.

—**International Harvester Co.,** Melrose Park, Ill. $1,224,820. Tractors. Chicago, Ill. Army Mobility Command, St. Louis, Mo.

—**Honeywell, Inc.,** Hopkins, Minn. $3,552,500. Bomb metal parts assembly. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Martin K Eby Construction Co.,** Wichita, Kan. $14,712,800. Rehabilitation, conversion and construction of facilities at Kansas Army Ammunition Plant, Parsons, Kan. Engineer Dist., Kansas City, Kan.

3—**U.S. Rubber Co.,** Mishawaka, Ind. $1,402,500. Collapsible nylon fabric water tanks. Mishawaka. Army Mobility Command, St. Louis, Mo.

—**Bernard McMenamy Contractor, Inc.,** St. Louis, Mo. $1,452,800. Channel excavation work at the Kaskaskia River, Ill., Navigation Project. Evansville, Ill. Engineer Dist., St. Louis, Mo.

—**Bethlehem Steel Corp.,** Bethlehem, Pa. $3,058,596. Tube forgings for 175mm guns. Bethlehem. Watervliet Arsenal, Watervliet, N.Y.

6—**Firestone Tire & Rubber Co.,** Akron, Ohio. $1,988,550. Bus and truck tires. Akron. Army Tank Automotive Center, Warren, Mich.

—**Ford Motors,** Dearborn, Mich. $1,189,245. Advance production engineering for 5-ton trucks. Dearborn. General Purpose Vehicles Project Office, Warren, Mich.

—**RCA,** Camden, N.J. $2,566,914. Radio sets. Camden. Army Electronics Command, Philadelphia, Pa.

—**AVCO Corp.,** Stratford, Conn. $4,744,369 and $2,760,155. Rotor turbine blades, air inlet vanes, deflector assemblies, and miscellaneous repair parts for T–53 engines

CONTRACT LEGEND

Contract information is listed in the following sequence: Date—Company—Value—Material or Work to be Performed—Location Work Performed—Contracting Agency.

for UH_1 helicopters. Stratford. Army Aviation Materiel Command, St. Louis, Mo.

8—**U.S. Rubber Co.**, Detroit, Mich. $2,632,900. Tires for trucks and trailers. Detroit and Los Angeles, Calif. Army Tank Automotive Command, Warren, Mich.

9—**Bendix Corp.**, South Bend, Ind. $1,497,996. Nose and main landing gears for OV–1 aircraft. South Bend. Army Aviation Materiel Command, St. Louis, Mo.

—**Dirilyte Co. of America**, Kokomo, Ind. $1,927,728. Fin blades for 2.75-inch rockets. Kokomo. Picatinny Arsenal, Dover, N.J.

—**Muncie Steelworks**, Muncie, Ind. $4,512,105. Nozzle and fin assemblies for 2.75-inch rockets. Muncie. Picatinny Arsenal, Dover, N.J.

—**Coastal Construction Co.**, Houston, Tex. $8,750,882. Work on the Sabine-Neches Waterway, Texas, Project. Port Arthur, Tex. Engineer Dist., Galveston, Tex.

10—**Stanford Research Institute**, Menlo Park, Calif. $2,363,355. Establishment of a lead laboratory (research and development). Office of Civil Defense, Washington, D.C.

—**Amron Corp.**, Waukesha, Wis. $6,914,194. 20mm brass cartridge cases. Waukesha. Frankford Arsenal, Philadelphia, Pa.

—**Pacific Car & Foundry Co.**, Renton, Wash. $8,671,249. 1½-ton cargo carriers. Renton. Army Tank Automotive Command, Warren, Mich.

13—**Kollsman Instrument Corp.**, Elmhurst, N.Y. $2,337,400. Metal parts for 4.2-inch cartridges. Melrose Park, Ill. Army Procurement Detachment, New York, N.Y.

—**Flinchbaugh Products, Inc.**, Red Lion, Pa. $2,510,016. Metal parts for 152mm projectiles. Red Lion. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Akwa Downey Construction Co.**, Milwaukee, Wis. $2,422,410. Alterations to launch complexes 25C and 25D at Cape Kennedy, Fla. Canaveral Engineer Dist., Merritt Island, Fla.

—**List & Clark Construction Co.**, Overland Park, Kan. $6,605,162. Work on the Galisteo Dam, N.M., Project. Engineer Dist., Albuquerque, N.M.

14—**Holston Defense Corporation of Eastman Kodak**, Kingsport, Tenn. $7,933,451. Miscellaneous explosives and operational and maintenance activities. Kingsport. Ammunition Procurement & Supply Agency, Joliet, Ill.

15—**H. J. High Construction Co.**, Orlando, Fla. $2,390,750. Construction of Phase III addition to the Headquarters Building, Kennedy Space Center, Merritt Island, Fla. Canaveral Engineer Dist., Merritt Island, Fla.

—**United Aircraft**, East Hartford, Conn. $2,860,000. JFTD Space 12A_4A turbine engine assemblies used on CH_54 Flying Crane helicopters. East Hartford. Army Aviation Materiel Command, St. Louis, Mo.

—**Thermo King Corp.**, Minneapolis, Minn. $1,103,233. Trailer mounted air conditioners. Minneapolis. Army Mobility Equipment Command, St. Louis, Mo.

16—**Union Carbide Corp.**, New York, N.Y. $1,213,894. BA–801/PRC dry batteries for AM–4306/PRC–25 radio frequency amplifiers. $2,818,591. BA–279/U dry batteries for AN/PRC–8,9 and 10 radios. Charlotte, N.C. Army Electronics Command, Philadelphia, Pa.

—**Servel, Inc.**, Freeport, Ill. $1,172,928. BA–279/U dry batteries for AN/PRC–8,9 and 10 radios. Freeport. Army Electronics Command, Philadelphia, Pa.

17—**Chamberlain Corp.**, Scranton, Pa. $3,007,300. Metal parts for 155mm projectiles. Scranton. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Olin Mathieson Chemical Corp.**, New York N.Y. $2,156,296. Miscellaneous propellant charges and operations and maintenance activities. Charlestown, Ind. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Motors**, Detroit, Mich. $6,184,163. Pick-up trucks. Baltimore, Md.; Fremont, Calif. and St. Louis, Mo. Army Tank Automotive Command, Warren, Mich.

—**General Electric**. Burlington, Vt. $1,475,000. 20mm automatic guns. Burlington. Army Weapons Command, Rock Island, Ill.

—**Tobler & Oliver Construction and Paul N. Smitler**, Carson City, Nev. $1,245,600. Construction of an ammunition maintenance facility at Sierra Army Depot, Herlong, Calif. Engineer Dist., Sacramento, Calif.

—**Bell & Howell Co.**, Chicago, Ill. $1,280,276. Metal parts for 81mm illuminating shell time fuzes. Chicago. Procurement Detachment, Chicago, Ill.

20—**Collins Radio Co.**, Cedar Rapids, Iowa. $2,102,752. Radio sets with ancillary items. Cedar Rapids. Army Electronics Command, Fort Monmouth, N.J.

—**Mason & Hanger, Silas Mason Co.**, New York, N.Y. $2,158,370. Loading, assembling and packing of medium caliber ammunition. Burlington, Iowa. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**E. I. DuPont de Nemours & Co.**, Wilmington, Del. $1,919,700. Demolition charges. Martinsburg, W. Va. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Grumman Aircraft Engineering Corp.**, Bethpage, N.Y. $2,865,000. Modernization of OV–1B aircraft. Bethpage. Army Aviation Materiel Command, St. Louis, Mo.

23—**Day & Zimmermann, Inc.**, Philadelphia, Pa. $2,564,352. Loading, assembling and packing of miscellaneous items of medium caliber ammunition. Texarkana, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Bell Helicopter Co.**, Fort Worth, Tex. $1,573,209. Gear box assemblies for UH–1 helicopters. $13,023,709. UH–1 helicopter transmission assemblies. Fort Worth. Army Aviation Materiel Command, St. Louis, Mo.

24—**Continental Motors**, Muskegon, Mich. $1,647,750. Engines for five-ton trucks. Muskegon. Army Tank Automotive Center, Warren, Mich.

—**TRW, Inc.**, Redondo Beach, Calif. $6,000,000. Classified electronic equipment. Redondo Beach. Army Electronics Command, Fort Monmouth, N.J.

—**Honeywell, Inc.**, Hopkins. Minn. $4,312,000. Grenade fuzes. New Brighton, Minn. and St. Louis Park, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

27—**AVCO Corp.**, Stratford, Conn. $6,385,502. Product support and product improvement services for T–53 engines during Calendar Year 1967. Stratford. Army Aviation Materiel Command, St. Louis, Mo.

—**Grumman Aircraft Corp.**, Bethpage, N.Y. $1,000,000. Services and supplies to fabricate avionic retrofit kits for OV–1A helicopters (Mohawk). Bethpage. Army Aviation Materiel Command, St. Louis, Mo.

28—**ACF Industries**, Carter Carburetor Div., St. Louis, Mo. $1,887,619. Metal parts for BLU–3/B bombs. St. Louis. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Scovill Mfg. Co.**, Waterbury, Conn. $1,866,817. Metal parts for BLU–3/B bombs. Waterbury. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Martin-Marietta**, Orlando, Fla. $4,160,900. Metal parts for XM2E1 canisters. Orlando. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Honeywell, Inc.**, Hopkins, Minn. $3,948,538. Three lines of automated assembly machines for production of M219E1 multi use fuzes. St. Louis Park, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Harvey Aluminum Sales, Inc.**, Torrance, Calif. $3,502,451. Loading, assembling and packing classified items of ammunition. Milan, Tenn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**U.S. Rubber Co.**, New York, N.Y. $9,402,682. Manufacture of explosives and loading, assembling and packing artillery ammunition and related components. Joliet, Ill. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Batesville Mfg. Co.**, Batesville, Ark. $1,885,873. Metal parts for BLU–3/B bombs. Batesville. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Raytheon Co.**, Bristol, Tenn. $1,175,634. M905 fuzes for the 750-lb. bomb. Bristol. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Motors**, Indianapolis, Ind. $1,507,780. TX–100–1 transmissions for M113 personnel carriers. $1,367,244. Rebuilding and retrofitting CD850 transmission assemblies for tank diesel engines. $1,336,690. Rebuilding and retrofitting CD850 transmission assemblies for tank diesel engines. Indianapolis. Army Tank Automotive Command, Warren, Mich.

—**Johnson Corp.**, Bellevue, Ohio. $1,525,064. M116A1, ¾-ton chassis and M101A1, ¾-ton cargo trailers. Bellevue. Army Tank Automotive Command, Warren, Mich.

—**General Motors**, Detroit, Mich. $1,496,973. Various trucks. Detroit. Army Tank Automotive Command, Warren, Mich.

—**Baifield Industries**, Carrollton, Tex. $1,239,000. ½-ton utility trucks. Carrollton. Army Tank Automotive Command, Warren, Mich.

—**Ford Motors**, Dearborn. Mich. $2,865,553. Tractor trucks. Louisville, Ky. $2,271,712. Various tank trucks. Birmingham, Ala. Army Tank Automotive Command, Warren, Mich.

—**Ford Motors**, Dearborn, Mich. $3,248,399. Various trucks. Claycomo, Mo. and Mahwah, N.J. Army Mobility Command, St. Louis, Mo.

—**FMC Corp.**, San Jose, Calif. $3,918,380. M113A1 armored personnel carriers and M548 cargo carriers. South Charleston, W. Va. Army Mobility Command, St. Louis, Mo.

—**Philco-Ford**, Newport Beach, Calif. $61,445,723. Classified quantity of Shillelagh missiles and guidance and control components. Lawndale, Calif. Army Missile Command, Huntsville, Ala.

—**Raytheon Co., Lexington, Mass. $1,204,150** Maintenance and modification of special tooling and test equipment to support the Hawk missile system. Andover, Mass. Army Missile Command, Huntsville, Ala.

—**Electronics Assistance Corp.**, Red Bank, N.J. $4,482,073. General purpose radio receivers. Red Bank. Army Electronics Command, Philadelphia, Pa.

—**Philco Corp.**, Philadelphia, Pa. $5,000,000. Classified electronic equipment. Philadelphia. Army Electronics Command, Fort Monmouth, N.J.

—**University of Illinois**, Urbana, Ill. $1,200,000. Twelve months investigative work to continue a program of experimental and theoretical research in pure and applied science in the broad spectrum of modern electronics sciences. Urbana. Army Electronics Command, Fort Monmouth, N.J.

—**AVCO Corp.**, Stratford, Conn. $1,294,267. T–53 turbine engine housing assemblies for UH–1 helicopters. Stratford. Army Aviation Materiel Command, St. Louis, Mo.

—**Grumman Aircraft Engineering Corp.**, Bethpage, N.Y. $1,800,000. Modernization of OV–1C Mohawk helicopters. Stuart Martin County, Fla. Army Aviation Materiel Command, St. Louis, Mo.

—**Martin-Marietta**, Orlando, Fla., $2,287,754. Metal parts for XM2 canisters. Orlando. Procurement Detachment, Chicago, Ill.

—**Lane Construction Corp.**, Meriden, Conn. $1,371,750. Work in the Blanchard Dam and Reservoir Project. Blanchard, Pa. Engineer Dist., Baltimore, Md.

—**Aeronca, Inc.**, Torrance, Calif. $1,073,266. Metal parts for XM3 mine dispensers. Torrance, Calif. and Middletown, Ohio. Southwest Procurement Agency, Pasadena, Calif.

—**TRW** Systems, Redondo Beach, Calif. $1,156,402. Classified work. Redondo Beach, Calif. and Wichita, Kan. Army Security Agency, Arlington, Va.

NAVY

1—**Royal Industries**, Alhambra, Calif. $1.160.350. 600-gallon external fuel tanks. Alhambra. Naval Air Systems Command.

—**Johns Hopkins University**, Silver Spring, Md. $4,870,369. Continued research & development on guided missiles, satellites and ordnance systems. Scaggsville, Md. Naval Ordnance Systems Command.

2—**General Precision**, Binghampton, N.Y. $1,500,000. Design, fabricate and test an F–4D weapons system trainer set. Binghampton. Naval Training Device Center, Orlando, Fla.

—**North American Aviation**, Columbus, Ohio. $14,816,000. Installment funding for the Condor missile. Columbus. Naval Air Systems Command.

—**General Electric**, Schenectady, N.Y. $19,440,000. Design and furnishing of Navy nuclear propulsion components for one nuclear powered frigate (DLGN). Schenectady. Naval Ship Systems Command.

3—**Todd Shipyards**, Seattle, Wash. $1,557.320. Activation work on the minesweeper USS Vigilance (MSF–324). Seattle. Supervisor of Shipbuilding, 13th Naval Dist., Seattle, Wash.

—**General Precision, Inc.**, Glendale, Calif. $1,912,237. Attack directors MK 75. Glendale. Naval Ordnance Systems Command. lated equipment for the Falcon air-to-air missile. Tucson, Ariz. Aeronautical Sys-

—**General Dynamics Corp.**, San Diego, Calif. $1,914,147. Components for the AN/ASB–12 bomb direction system for RA–5C aircraft. San Diego. Navy Aviation Supply Office, Philadelphia, Pa.

6—**Motorola, Inc.**, Scottsdale, Ariz. $1,565,000. Guidance and control groups for Sidewinder guided missiles. Scottsdale. Naval Air Systems Command.

—**General Electric**, Schenectady, NY. $3,091,130. Design and furnish nuclear propulsion components. Schenectady. Naval Ship Systems Command.

7—**General Motors**, Indianapolis, Ind. $2,141,300. Spare parts for T–56A16 engines used in KC–130 aircraft. Indianapolis. Navy Aviation Supply Office, Philadelphia, Pa.

—**M. Steinhall Co.**, New York, N.Y. $1,101,493. Parachute packs and lanyard assemblies used with the MK 56 underwater mine. Roxboro, N.C. Naval Ordnance Station, Louisville, Ky.

—**United Boatbuilders**, Bellingham, Wash. $12,825,000. Supplies and services for the production of MK 46 torpedoes. North Hopkins. Naval Ordnance Systems Command.

—**United Boatbuilders**, Bellingham, Wash. $1,297,032. Construction of 51 twenty-six-foot personnel boats. Bellingham. Naval Ship Systems Command.

—**Texas Instrument, Inc.**, Dallas, Tex. $1,211,568. Services and material to accomplish work connected with exploratory effort on the advanced anti-radiation missile guidance system program. Dallas. Navy Purchasing Office, Los Angeles, Calif.

10—**Sperry Rand Corp.**, Syosset, N.Y. $2,087,000. Technical services performed in overhaul of submarines. Syosset Naval Ship Systems Command.

—**North American Aviation**, McGregor, Tex. $2,520,000. Rocket motors for Sparrow and Shrike missiles. McGregor. Naval Air Systems Command.

—**Sanders Associates**, Nashua, N.H., $2,185,672. Continued development of a droppable anti-submarine warfare sono-buoy system. Nashua. Naval Air Systems Command.

13—**United Aircraft**, East Hartford, Conn. $76,201,609. TF–30P–3 and TF–30–P–12 engines. $3,500,000. Phase II development of the TF–30–P–12 engine. East Hartford. Naval Air Systems Command.

15—**Raytheon Co.**, Bedford, Mass. $1,610,000. Installment funding for long lead time effort and material for research and development on AIM–7F Sparrow guided missile rocket motors. Bedford. Naval Air Systems Command.

16—**Triumph Industries**, Houston, Tex. $1,116,332. Construction of twenty-eight 33-foot personnel boats. Houston. Naval Ship Systems Command.

—**Sperry Rand Corp.**, Bristol, Tenn. $2,508,089. Shrike missiles. Bristol. Naval Air Systems Command.

—**Sperry Rand Corp.**, Great Neck, L.I., N.Y. $1,040,000. Control system modernization of the Terrier MK 76, mods 3 and 5. Great Neck. Naval Ordnance Systems Command.

20—**United Aircraft**, Stratford, Conn. $2,100,000. HH–3E helicopters for the Air Force. Stratford. Naval Air Systems Command.

—**IBM**, Washington, D.C. $1,062,987. Single line item requisition forms. Washington, D.C. Navy Purchasing Office, Washington, D.C.

—**FMC Corp.**, San Jose, Calif $1,213,042. Production of model of a cleaning machine for large aircraft. San Jose. Naval Air Systems Command.

Lockley Machine Co., New Castle, Pa. $2,216,046. Launchers for use with Zuni rockets. New Castle. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Hughes Aircraft**, Culver City, Calif., $3,798,200. Two missile control operator trainers for data and support of F–111B weapon system. Inglewood, Calif. Naval Training Device Center, Orlando, Fla.

21—**Lockheed Aircraft**, Burbank, Calif. $3,449,500. Modification of SP–2H aircraft. Burbank. Naval Air Systems Command.

—**Grumman Aircraft Engineering Corp.**, Bethpage, N.Y. $1,569,471. Necessary documentation to support a proposal for the E–2B aircraft. Bethpage. Naval Air Systems Command.

—**Gould National Batteries, Inc.**, St. Paul, Minn. $9,899,046. Submarine battery elements and cells. Kankakee, Ill. Naval Ship Systems Command.

23—**General Dynamics**, Pomona, Calif. $3,000,000. Standard Missile, Type I, guidance control and ordnance sections. Pomona. Naval Ordnance Systems Command.

—**FMC Corp.**, San Jose, Calif. $1,525,000. Engineering services in support of landing vehicle tracked personnel craft. San Jose. Naval Ship Systems Command.

—**Avondale Shipyards, Inc.**, Westwego, La. $3,254,000. Activation and modification of the USS Elk River (LSMR–501). New Orleans, La. Supervisor of Shipbuilding, 8th Naval Dist., New Orleans, La.

Brewer Drydock, Inc., Staten Island, N.Y. $1,363,000. Regular overhaul of the USS Mazama (AE–9). Staten Island. Supervisor of Shipbuilding, 1st Naval Dist., Boston, Mass.

24—**General Dynamics**, Pomona, Calif., $15,000,000. Standard Arm missile. Pomona. Naval Air Systems Command.

—**Martin-Marietta**, Middle River, Md., $1,354,317. Classified equipment. Middle River. Naval Air Systems Command.

27—**General Electric**, Washington, D.C. $2,230,806. Polaris MK 2 guidance systems. Pittsfield, Mass. Special Projects Office.

—**General Electric**, Schenectady, N.Y. $5,408,000. Design and furnishing of Navy nuclear propulsion components. Schenectady. Naval Ship Systems Command.

—**Sanders Associates**, Nashua, N.H. $1,800,000. Continued basic engineering and development of an air droppable ASW sonobuoy system. Nashua. Naval Air Systems Command.

—**Bendix Corp.**, North Hollywood, Calif. $1,940,628. Sonar sets. North Hollywood. Naval Air Systems Command.

28—**Hughes Aircraft**, Culver City, Calif. $7,000,000. Installment funding for Phoenix missile systems. Culver City. Naval Air Systems Command.

—**Horne Bros.**, Newport News, Va. $1,594,000. Regular overhaul of the auxiliary oiler USS Marias (AO–57). Newport News. Supervisor of Shipbuilding, Fifth Naval Dist., Norfolk, Va.

—**Buck Kreihs Co.**, New Orleans, La. $2,673,000. Activation of the landing craft repair ship USS Satyr (ARL–23). New Orleans. Supervisor of Shipbuilding, Eighth Naval Dist., New Orleans, La.

—**Avondale Shipyards**, Avondale, La. $3,289,543. Activation of the landing craft repair ship USS Sphinx (ARL–24). Avondale. Supervisor of Shipbuilding, Eighth Naval Dist., New Orleans, La.

MARINE CORPS

6—**Raytheon Corp.**, Andover, Mass. $1,288,999 Updating of the Hawk missile depot repair facilities at Marine Corps Supply Centers at Albany, Ga. and Barstow, Calif. Headquarters, Marine Corps.

AIR FORCE

1—**Sperry Rand Corp.**, Charlottesville, Va. $1,062,922. Production of components for radar equipment on C–130 and C–141 aircraft. Charlottesville. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Burroughs Corp.**, Paoli, Pa. $5,500,000. Production and installation of an air defense warning and communication system. Paoli and an overseas site. Electronics Systems Div., (AFSC), L. G. Hanscom Field, Mass.

—**Goodyear Aerospace Corp.**, Akron, Ohio. $1,543,260. Production of air cargo handling pallets. Akron. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga.

—**Raytheon Co.**, Waltham, Mass. $3,136,910. Modification of the bomb-navigational system on B–58 aircraft. Waltham. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga.

—**Sperry Rand Corp.**, Great Neck, L.I. NY. $3,461,612. Modification of the bomb-navigational system on B–58 aircraft. Great Neck. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga.

2—**Lockheed Aircraft**, Marietta, Ga. $4,000,000. Production of C–130 aircraft. Marietta. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**General Electric**, Utica, N.Y. $10,000,000. Production of components for airborne electric systems. Utica. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

3—**Hughes Aircraft**, Culver City, Calif. $3,225,045. Prduction of spare components and related equipment for Falcon air-to-air missiles. Culver City. Ogden Air Materiel Area, (AFLC), Hill AFB, Utah.

6—**Bendix Corp.**, Teterboro, N.J. $2,349,630. Production of flight instruments for C–141 aircraft. Teterboro. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Honeywell, Inc.**, Hopkins, Minn. $1,750,000. Mine fuzes and related equipment. Hopkins. Aeronautical Systems Div., (AFSC) Wright-Patterson AFB, Ohio.

—**Westinghouse Electric**, Baltimore, Md. $1,090,000. Production of airborne communications equipment. Baltimore. Electronics Systems Div., (AFSC), L. G. Hanscom Field, Mass.

8—**United Aircraft**, East Hartford, Conn. $2,335,840. Production of spare parts for J–57 aircraft engines. East Hartford. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex.

—**Martin-Marietta**, Baltimore, Md. $1,397,500. Engineering of non-integral structures for hypersonic vehicles. Middle River, Md. Systems Engineering Group, Research & Technology Div., (AFSC), Wright-Patterson AFB, Ohio.

9—**General Electric**, West Lynn, Mass. $2,805,900. T–58 aircraft engines. West Lynn. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

14—**General Motors**, Milwaukee, Wis. $1,140,000. Production of airborne navigation equipment. Milwaukee. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**General Electric**, Cincinatti, Ohio. $2,000,000. J–79 aircraft engine component improvement program. Cincinnati. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

15—**General Electric**, West Lynn, Mass. $1,937,861. Production of spare components for J–85 aircraft engines. West Lynn. Oklahoma City Air Materiel Area, (AFLC), Tinker AFB, Okla.

—**White Motors**, Springfield, Ohio. $1,050,000. Production of electrical generators. Springfield. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif.

16—**Eastman Kodak Co.**, Rochester, N.Y. $1,685,096. Production of photographic processing equipment and spare parts. Rochester. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Lear Siegler, Inc.**, Grand Rapids, Mich. $1,540,575. Production of flight instruments for fighter aircraft. Grand Rapids. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Schenuit Rubber Co.**, Baltimore, Md. $1,360,497. Production of tires for KC–135 aircraft. Baltimore. Ogden Air Materiel Area, (AFLC), Hill AFB, Utah.

17—**Honeywell, Inc.**, Hopkins, Minn. $2,000,000. Production of land mines and associated equipment. Hopkins. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**General American Transportation Corp.**, Niles, Ill. $4,200,000. Production of bomb components. Niles. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

20—**Mitre Corp.**, Bedford, Mass. $2,150,602. Research and development for systems engineering and technical direction in the field of command and control systems. Bedford. Electronics Systems Div., (AFSC), L. G. Hanscom Field, Mass.

—**Honeywell, Inc.**, Hopkins, Minn. $1,750,000. Production of fuzes for mines and related equipment. Hopkins. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Lear Siegler, Inc.**, Grand Rapids, Mich. $1,344,051. Production of aircraft bombing computers. Grand Rapids. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

21—**Curtiss-Wright Corp.**, Wood-Ridge, N.J. $3,248,066. Production of spare parts for R–3350 aircraft engines. Wood-Ridge. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex.

23—**Hughes Aircraft**, Culver City, Calif. $4,320,000. Production of components and retems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Lockheed Aircraft**, Burbank, Calif. $1,010,825. Modification of F–104 aircraft. Burbank. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif.

24—**North American Aviation**, Anaheim, Calif. $3,102,000. Production of depot maintenance equipment to support the Minuteman missile program. Anaheim. Ballistic Systems Div., (AFSC), Norton AFB, Calif.

27—**Applied Technology, Inc.**, Palo Alto, Calif. $1,972,680. Production of airborne radar equipment. Palo Alto. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga.

Contract Definition Reports Available

Two reports dealing with the contract definition process, of general interest to all persons connected with this phase of development of major DOD systems and of particular interest to those responsible for contract definition of specific development projects, are now available.

"A Report on Contract Definition" was prepared for the Office of the Director of Defense Research and Engineering (ODDR&E) by Peat, Marwick, Livingston and Co.

The second report, "Close Collaboration in Contract Definition," was prepared by the MITRE Corp.

"A Report on Contract Definition" contains discussions and interpretations of pertinent portions of DOD Directive 3200.9, typical activities and timing of Phases A, B, and C of contract definition, and critical areas, such as the prerequisites to engineering development, volume of data and technical transfusion.

"Close Collaboration in Contract Definition," MITRE Technical Paper MTP–48 (ESD–TR–67–103), discusses the issues that may arise in the conduct of that part of contract definition during which the Government and its contract definition contractors are intended to closely collaborate with each other. The report deals with questions of what constitutes proper guidance to contractors, what the focus of close collaborators should be, and how sensitive contract definition information is. It also suggests certain administrative and procedural arrangements for helping to assure that contract definition contractors are adequately guided without jeopardizing the maintenance of the fully competitive environment intended during a contract definition effort.

"A Report on Contract Definition" is available to users of the Defense Documentation Center at Cameron Station, Alexandria, Va. 22314, under Order Number AD–646 240. It can be purchased by non-users through the Department of Commerce Clearinghouse for Federal and Scientific Information, Springfield, Va., 22151, for $3 a copy.

"Close Collaboration in Contract Definition" will also be included in the Defense Documentation Center collection. In the interim, requests for it should be addressed to the MITRE Corp., Attention Dr. N. Waks., P.O. Box 208, Bedford, Mass., 01730.

New Amphibious Vehicle Under Development

The U.S. Army Tank-Automotive Center (ATAC), Warren, Mich., is building seven pilot models of an experimental Marine Corps Marginal Terrain Vehicle (MTV) being developed to operate in the swamps and rice fields of Southeast Asia.

Officially designated the XM759 Cargo Carrier (soft tire tracked), the one-and-one-half-ton vehicle is specifically designed to operate in areas comprised mostly of water and mud.

ATAC was given the job of developing the vehicle through an agreement between the Marine Corps and the Army Materiel Command.

To speed up the program, ATAC took on the job of building the seven pilot models in its shops at the Detroit Arsenal. At the same time requests for quotations were sent out to industry for an advanced production engineering and limited production contract.

The MTV, with a gross weight of 11,500 pounds, will carry 3,000 pounds of cargo or a fully equipped Marine squad of 14, and is operated by a two-man crew.

In appearance it looks like a tracked vehicle except that instead of conventional tracks it has a set of chains on each side resembling giant bicycle chains and 17 wide-track, low pressure terra-tires are strung between the chains. The chains are driven by two large sprockets located on each side at the front. Two similar sprockets at the rear are adjustable to exert tension on the chain.

The vehicle rolls over the wheels in contrast to the normal wheel-axle arrangement where the rolling of wheels moves the vehicle.

The light-weight aluminum construction in combination with the terra-tires will provide the MTV with excellent amphibious capabilities. The air pressure of the tires will be approximately three pounds a square inch. The wheels propel the vehicle at about seven miles an hour over inland waters. Top land speed is about 35 miles an hour.

The vehicle will be controlled the same as any tracked vehicle with turning achieved by the slowdown or stopping of one side while the wheels on the other side are accelerated.

DSA Support To Encompass 19 Weapon Systems

The Defense Supply Agency (DSA) weapon systems support program will provide supply items for the Army's Sheridan tank and the Navy's 3–T's (Terrier, Tartar and Talos) missile ships, beginning in March. This will bring DSA's support of Military Service weapon systems to a total of 19, involving about 157,000 items.

DSA's role in support of Service weapon systems is basically confined to the supplying of maintenance support items which are of the commercial type. They are considered to be the "bits and pieces" of the systems, as opposed to major assemblies, components, end items and major equipment which continue to be supplied directly by the Services.

The scope of this type of support by DSA is reflected in the fact that the agency provides some 70,000 items of the approximately 120,000 items supporting the Polaris system.

For the 17 systems already being supported by DSA, the agency is maintaining a current stock availability of 95 percent of the 140,000 items involved. About half of these items are of the electronic type stocked by the Defense Electronics Supply Center at Dayton, Ohio, a field activity of DSA. The remaining items are scattered between the various other DSA centers throughout the United States.

With the two new additions, DSA will supply about 5,000 items of the Sheridan tank and 12,000 of the Terrier, Tartar and Talos missile ships.

DEFENSE PRIME CONTRACT AWARDS TO SMALL BUSINESS

(Amounts in Thousands)

	July-Dec. 1966	July-Dec. 1965
Procurement from All Firms	$19,387,803	$15,128,683
Procurement from Small Business Firms	3,991,413	3,182,265
Percent Small Business	20.6	21.0

☆ U. S. GOVERNMENT PRINTING OFFICE : 1967 250-977/9

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

OFFICIAL BUSINESS

UNIVERSITY OF FLORIDA
3 1262 09683 3933

AID

FLARE

Project Themis

A PROGRAM TO STRENGTHEN THE NATION'S ACADEMIC INSTITUTIONS

Themis, a new university-based research program designed to strengthen the scientific and engineering capabilities of selected academic institutions throughout the United States, and to enable a larger number to carry out high quality research on problems relating to the national security, has been initiated by DOD.

The Secretary of Defense, in announcing the program, stated that the project is being conducted to establish new academic centers of excellence in research areas important to DOD's long range scientific and technological goals.

Brochures have been sent to more than 400 universities describing the aims of the program and requesting the schools to submit proposed programs. Up to 50 new departmental centers will be initiated this year with additional programs to be established in following years.

It is expected that development of additional university graduate research in specific areas relating to defense will contribute to long range U.S. security both by the production of advanced research results and by the research training made possible by a broader base of university centers.

Ninety problems needing research in eight specific areas in science and technology have been identified in which the development of additional university graduate research at the doctoral level could contribute to the national defense. These areas cover the physical, engineering, environmental and medical sciences. Specific areas needing attention are: detection, surveillance, navigation and control; energy and power; information processing systems; technology of military vehicles; materials sciences; environmental sciences, medical sciences, social and behavioral sciences. Submissions covering other prospective research areas of comparable scope and relevance to the defense mission are also invited and will be considered for support under Project Themis.

First consideration will be given in Project Themis to institutions not already heavily engaged in defense research. More than one specific research program can be authorized for a single institution.

Copies of the Project Themis brochure may be obtained by request to the Director of Defense Research and Engineering, The Pentagon, Washington, D.C. 20301.

Space Forecasting Working Group Established

A working group on space forecasting, consisting of scientists working in seven distinct areas of environmental research, has been established at the Air Force Cambridge Research Laboratories (AFCRL), L. G. Hanscom Field, Mass. The group will provide in-depth technical competence in developing and standardizing techniques for forecasting changes in the aerospace environment. It will operate under the chairmanship of Major Ronald A. Bena, Chief of the AFCRL Space Forecasting Branch.

The seven areas of research under the purview of the working group are: high altitude density, ionospheric conditions, energetic particles, geomagnatism, solar radio activity, solar optical activity, and solar x-ray events.

AFCRL's space forecasting program was established in January 1964 to uncover clues that would affect Air Force operations, particularly those changes that might degrade the performance of surveillance and reconnaissance equipments. Space forecasting data are acquired by a host of sensors—ground-based sensors, sensor carrying satellites, instrumented high altitude aircraft, high altitude balloons, and optical and radio telescopes.